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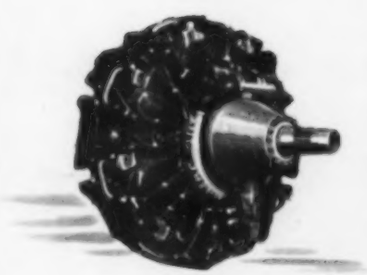

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FEBRUARY, 1943 VOL. XIX, NO. 2

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The Birdmen's Perch

Flutter called our attention to an article in the newspaper a few days ago.

We wish we had a smoke tank in the Gulfhawk—we'd go upstairs and write the article all over the sky. Maybe not the whole thing . . . but there's one statement in it that everybody who's done any grousing about fuel or gasoline rationing should know:

"*Two thirds of the tonnage of supplies allotted to each soldier on the second front is oil!*"

Guess that settles *that!*

Major Al Williams,
alias, "Tattered Wing Tips," Gulf Aviation Products Manager, Gulf Bldg., Pittsburgh, Pa.

SUPERCHARGING AND SUPER-REFINING

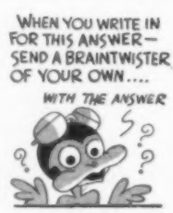
If you were building warplanes, one of your biggest problems would be to make them fly *higher*.

The first thing you would do to get more altitude would be to fit your plane with the best engine known. This engine would make your plane fly high—but not high enough. Because above certain altitudes, the engine wouldn't get enough air. So you'd get more air to the engine by supercharging. With supercharging, more of your fuel mixture would burn, less of it would go out the exhaust, and you'd get better performance from your plane.

If you were refining oil, one of your biggest problems would be to make the oil *cleaner*.

The first thing you would do to get more dirt out of your crudes, would be to use the best refining methods known. This would clean the oil—but not enough for Gulf. Because beyond a certain point, ordinary refining methods don't remove enough of the carbon-makers and sludge-formers. Gulf gets *more* of these out of Gulfpride by the exclusive Alchlor Process. With this technique, more of Gulfpride actually lubricates, less of it forms carbon, sludge, and gum . . . and you get better performance from your engine.

DIMINISHING BRAINTWISTER



A plane made 5 stops between WA and LA. At each stop, half the passengers aboard left the plane. And at each stop passengers came aboard, starting with 5 passengers at the first stop; 4 passengers at the second stop; 3 at the third stop; 2 at the fourth stop; 1 at the fifth stop. The plane arrived at LA with 5 passengers. How many were aboard when it left WA?

A FEW CUTTING REMARKS

Machine tools cut mechanical parts out of metal stock the way a boy whittles toys out of wood.

But cutting steels, bronzes, and aluminum builds up terrific friction heat on the tool—or "knife." To dissipate this heat and obtain a better finish on the work, a constant stream of "cutting oil" is played on the cutting tool.

In a recent demonstration, Gulf Cut-Aid—a new cutting oil perfected by the scientists in Gulf's Research Laboratories—was used on a machine that was throwing up a plume of smoke while operating at 100 surface feet a minute. After the new cutting oil was added to the lubricant already in use, there was not a trace of smoke at *300 feet a minute!* In another operation, Cut-Aid extended tool life from 3 hours between regrinds to 11 hours, and the finish on the aluminum that was being formed was declared changed from "fair" to "excellent."

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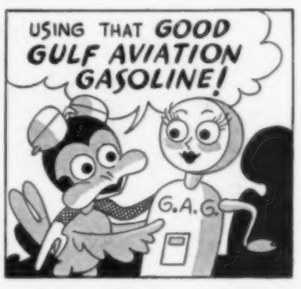

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REVVING UP

COME AGAIN, GENERAL: Air support enabled his infantry to annihilate 15,000 Japs in Papua, says General MacArthur, generously describing this as the "key" to success by air power. Thanks, General, but air power's "key" won't be found in Papua, or the Solomons, or Tunisia. It is in Japan and Germany proper — that's where air power will conquer the enemy.

★ ★ ★

WHERE'S THE HARUNA? The Army said on Dec. 11, 1942, the ship was sent to the bottom of the Pacific by Capt. Colin Kelly's B-17. But the Navy has never listed it as being sunk. Moreover, a Navy ace, Lt. John Thach, astounded Washington newspapermen several months ago by strongly suggesting — and then refusing to elaborate — that the 29,000-ton Jap battleship was NOT sunk.

A step in the direction of a solution to this engrossing, if not impossible, situation was taken the other day when news came from Australia that Kelly's bombardier had been decorated for the feat, more than twelve months after his pilot had been cited as one of the country's first air heroes. The bombardier, Sgt. Meyer Levin of Brooklyn, said he saw the **Haruna** go down: "She listed and sank."

After this development, the Navy in Washington admitted it had never carried the big Jap battlewagon as having been destroyed—there has been a policy for the Navy not to list enemy vessels claimed by the Army, it was explained.

★ ★ ★

IRREPARABLE LOSS: Aviation suffered a major blow when a transport flying from Porto Rico to an unannounced destination became lost in the Caribbean with Colonel Walter Sumpter Smith, Major Lew Barringer and seven others aboard. Smith, an Alabaman who was air officer of the 31st (Dixie) Division before being called to Washington as chief of the Transport and Facilities Division of the Army Air Forces, had been chairman of the Air Safety Board of the CAA. Barringer, chief of glider production and training of the Air Support Command, had done much to bring about final recognition in this country of the glider's tremendous possibilities in war and peace. He was one of four holding the coveted "Golden C" rating—highest in soaring—and held the world's record of 14,960 feet for sailplane altitude accompanied by a passenger.

★ ★ ★

SINGING PRAISE: Eddie Rickenbacker told North American Aviation, Inc., workers at Inglewood, Calif., the other day that the P-51 Mustang is the "most outstanding fighter plane in the world." He said while in England he saw comparative tests between the Mustang and the latest Focke Wulf, and "frankly, the Mustang outperformed it." . . . Hap Arnold really spread it on thick at Douglas when he told how forty-four C-47's flew paratroopers nonstop 1,500 miles from Britain to Tunisia — a feat in timing and transport which makes the German eighty-five-mile shuttle work at Crete look puny. . . . President Roosevelt's sensational jaunt to Casablanca was in a Clipper, and Winston Churchill used a Consolidated Liberator Express.

★ ★ ★

PASS THIS ON: If Dayton Orr, former chief pilot for Bill McCraw, sees this, we want him to wire his address immediately to the Editor, SOUTHERN FLIGHT, Dallas, Texas. One of his former students needs twenty hours verified to keep out of the walking army. Hurry!

★ ★ ★

YOUTH IN AVIATION: One of the most valuable assets of aviation is its many young leaders . . . men who work all hours of the day, who disregard the "impossible," who exploit their talents for all their worth, who adjust themselves to constant changing and improvements regardless of tradition. There are many such leaders in the aviation industry, but one of the most impressive is George Newman. At thirty-four he is vice president of Consolidated Aircraft Corp., and manager of its Fort Worth bomber factory, said to be the largest in the world. We think you'll enjoy a little story in words and pictures about him on pages forty-two and forty-three in this issue . . . it should reassure those of us who still have work to do.

NEWMAN

★ ★ ★

QUOTING FIGURES: How powerful were the Axis air forces on September 1, 1939? A good guesser would recall the figures of so-called experts of the day, who had

(Continued on page 10)

NATIONAL WAFS HEADQUARTERS under the direction of Mrs. Nancy Harkness Love, have been transferred to the Fifth Ferrying Group in Dallas, Texas. Mrs. Love, being welcomed here by Col. Tom Ferguson and his aides, reported with the first group of women pilots and they immediately assumed the regular duties of the Air Transport Command. Mrs. Love has been flying since 1930 and has more than 1,500 hours.

A new name in America's warplane production*

"Trigger planes"—that's what our pilots call the fighter planes and bombers that are ready for front line action.

But not many of America's mass-produced ships are "trigger planes" as they roll from the assembly lines. So rapid are the changes in tactics and developments in aerial warfare that some features of these planes are rendered obsolete before they leave their factories.

The Army Air Corps' answer to the problem of keeping our planes superior to the enemy's, without delaying production, has been the creation of *modification centers*. Here the latest combat experiences and newest discoveries are incorporated into our war planes to make them the "fightingest" ships in the air.

Down in Birmingham, Alabama, we are completing and placing into operation one of the most advanced modification centers yet established in the United States. In this plant, designed and built

by us, huge B-24 Liberator bombers are being given their final grooming for front line service. They are being prepared for assignments in North Africa . . . Europe . . . the Middle East . . . India . . . China . . . the South Pacific . . . the Aleutians . . . for every part of the world . . . and for the specific climatic and tactical conditions under which they will be flown.

They are "trigger planes" in every sense of the word when they leave our plant, battle-bound. Armed to the teeth, guns manned, they are ready to meet enemy fighter planes the moment their wheels lift from our runway.

* Bechtel-McCone-Parsons Corporation is a new name in the aircraft industry, but the members of our highly experienced organization are old hands at engineering, constructing and operating industrial enterprises, and in undertaking difficult and challenging projects.

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REVVING UP

(Continued from page 8)

Germany alone toying with 10,000 to 20,000 first-line planes. But was the Luftwaffe that numerous?

What is believed to be the most reliable solution to this mystery has been furnished by the Office of War Information. Counting only "modern fighting planes ready for combat," the OWI says Goering had only 5,000 planes at his disposal when the Polish invasion touched off World War II. Japan had only 3,000 planes and Mussolini 1,800.

So we can now see that the Axis could have thrown a total of 9,800 fighting planes against civilization if the world, and not just Poland, had challenged the Germans back on September 1, 1939. This number is far short of the wild guesses of "experts" who conjured up enemy air fleets ranging as large as 30,000 planes.

Russia had 4,500 first-rate combat craft, England 2,000 and France 1,800, says the OWI. Thus a total of 8,300 Allied planes could have challenged the 9,800 of the Axis.

★ ★ ★

AVG GENEROSITY: The record of Claire Chennault's Flying Tigers against the Japs before and after Pearl Harbor still remains the most colorful of any unit on our side opposing the Slanteyes. But there's one AVG who would remind the world not to overlook the accomplishments of Hap Arnold's boys since July 4, when the Army Air Forces disbanded the Tigers.

"The Japs are taking a licking from the U. S. Army Air Forces as bad as they ever got from the AVG," says Captain A. J. (Ajax) Baumler, who shot down four Germans and three Italians in Spain before joining the AVG in China and who now has six Japs to his credit.

The Tigers were good fighting men, says Ajax, but "America has 'em in lots of places, and they haven't been restricted to the AVG." He still rates Chennault as America's No. 1 airman.

Baumler, whose home is in Bayonne, N. J., made his comment in a letter sent recently from China to Allen and Marian Guiberson of Dallas, who used to visit him when he was stationed at Barksdale Field, Shreveport, La. He now commands the 74th Fighter Squadron and has been decorated with the Distinguished Flying Cross. Of the six Japs to his credit, two were heavy bombers.

★ ★ ★

NEW JAP FIGHTERS: Vastly improved Jap fighting planes are making their appearance in China, says Baumler. "In some ways, the situation has changed, for the Jap has developed several brand new fighters since the AVG left," the ace wrote the Guibersons. "They are superior to anything the AVG ever fought against up to July 4, 1942."

★ ★ ★

SMALL WORLD, ISN'T IT? Air Transport Command pilots are figuring in almost incredible situations as they flit about the globe. Allen Guiberson tells of one of the most unusual happenings involving Capt. Kenneth Burke of the ATC, formerly of Dallas and Houston; Red Probst, of Waco, former AVG, now instructing British students at Bill Long's operation at Terrell, Texas; Flight Leader Browning of the RAF, and the Guibersons. Probst, en route from China to Dallas, met Flight Leader Browning in a conversation aboard the Clipper en route from Dakar to Natal. "I'm going to Dallas," said Red. "Well, I'll say, now," answered the Britisher. "I've got a note a chap in the desert gave me to mail to somebody in Dallas when I arrive in the States." The letter was stowed away, and Browning couldn't recall the name, but he did remember the street address was 3711 something-or-other. "Gimme," said the returning Flying Tiger. "That's right where I'm going—3711 Beverly Drive in Dallas." The Britisher found the letter and sure enough it was addressed to Allen Guiberson and his wife, at whose home Probst was to be a guest. It was from Burke, the ATC pilot back in the desert.

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Get This Flag Flying Now!

This War Savings Flag which flies today over companies, large and small, all across the land means *business.* It means, first, that 10% of the company's gross pay roll is being invested in War Bonds by the workers voluntarily.

It also means that the employees of all these companies are doing their part for Victory . . . by helping to buy the guns, tanks, and planes that America and her allies *must* have to win.

It means that billions of dollars are being diverted from "bidding" for the constantly shrinking stock of goods available, thus putting a brake on inflation. And it means that billions of dollars will be held in readiness for post-war readjustment.

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JUST AMONG OURSELVES

Civil Aviation's Darkest Hour

(AN OPEN LETTER)

Capt. Haddaway

Editor's Note: George E. Haddaway, Editor, is on leave from his desk at SOUTHERN FLIGHT to serve with the Civil Air Patrol as commander of a base "Somewhere on the Gulf Coast." His men maintain constant vigil for Axis submarines in Gulf waters, ranging afar in privately-owned planes, which the Army says are equipped with bombs. Observations on the rapidly-changing picture of civil aviation are made in the following letter to his Associate Editor:

Dear Tom:

In January two momentous announcements were made that will affect civil aeronautics for the duration of the war. Interestingly enough both announcements issue from the high and mighty quarters of the U. S. Army Air Forces, the first appearing in the official Air Forces publication revealing that CAP Coastal planes are carrying bombs. As you know, those of us close to this activity have had to keep our mouths shut; but now you can expect the gates to open and the flood waters of publicity break in all the general interest publications. The second significant information to come from the Army involves another revision in the CAA War Training Service (formerly Civil Pilot Training).

Already the effects of these two official releases are noticed. Let us consider first the Army's new attitude and intentions regarding the CAA War Training Service. Immediately following their plans "to expand their use of CAA training facilities," the ownership of all civil aircraft was frozen. Henceforth, no airplanes can be sold, leased or rented without the approval of the War Production Board. The Army, the Navy, and the Civil Aeronautics Administration will allocate all civil aircraft and equipment from now on out. The Defense Plant Corporation will purchase aircraft and lease them out to operators.

The Air Forces have revised the CPT program, or rather the War Training Service, into two divisions. In the first division, now in operation, training will be given to men who will eventually qualify as service pilots and instructors. In the second division new special qualification courses will be conducted for a certain proportion of prospective aviation cadets prior to their entry in the regular Army Air Forces schools. The number will depend on the amount of equipment available. At the present time a large number of these men are in the enlisted reserve awaiting call to active duty. The Army plans to call these men in the near future and assign them to approximately one hundred colleges where they will receive a course of study and training under the direction of AAF officers. Although the Army release states that this course will be supplemented in its latter part by flying instruction by the WTS "to the extent that facilities permit", from all I can gather this flight training will consist of only eight hours of dual instruction plus two hours of solo. In other words, there will be *more* young men in training but a considerably *reduced* number of flight hours. One source of information advises that the Army expects to establish a five-months' course, the last month to include the above mentioned thimble-full of flight training, ultimately to produce 14,000 pre-cadet-stage candidates per month.

I wish some of the experts would tell me where they are going to find that much cadet material unless they are draftees. Perhaps the plan will work. But, ever since the Army started breaking into the CPT program some two years ago, nothing has worked very effectively and there has been no major long-range plan of flight training. They have continued on a month-to-month basis with no assurance to the operators of any measure of permanency, any measure of standardized flight and ground training for a specific purpose, or any administration that would give stability to these operations. They consistently circumvented capable CAA-CPT administrators. They continued to use up the healthy reservoir of civilian type training plans while shutting off the manufacture of sensible replacements of entire airplanes, engines, and spare parts. Now, worst of all, the plan to utilize one hundred colleges sounds the death knell for hundreds of small operators in hundreds of communities who have been doing a magnificent pilot training job individually as well as in the aggregate.

What an ignoble end for the little business man of aviation who has striven so sincerely and diligently to serve his nation in a time of peril and who (along with the CPT program), above all others, is largely responsible for the immediate expansion of the Air Forces when war was finally declared. He was a reality and not a contract for future delivery.

Surely, the officials in charge and those with the power to determine the future course of pilot training cannot conscientiously permit the little opera-

(Continued on page 50)

Text of WPB Order Freezing Small Planes

Part 3191—Aircraft

(General Limitation Order L-262)

The fulfillment of requirements for the defense of the United States has created a shortage in the supply for defense, for private account, and for export, of aircraft; and the following order is deemed necessary and appropriate in the public interest and to promote the national defense:

§ 3191.1 **General Limitation Order L-262—(a) Restrictions on transfer of link trainers and certain aircraft.** No single-engined aircraft of five hundred horsepower or less, nor any "link trainer", nor any interest therein, shall be sold, leased, traded, rented, given or delivered by any individual, partnership, association, business trust, corporation or any organized group of persons (whether incorporated or not), exclusive, however, of the Army or Navy of the United States, any United States Governmental agency, any air carrier holding a certificate of necessity from the Civil Aeronautics Board, or any manufacturer of aircraft, except pursuant to specific authorization of the Director General for Operations.

(b) **Applicability of priorities regulations.** This order, and all transactions affected thereby, are subject to the provisions of priorities regulations of the War Production Board, as amended from time to time.

(c) **Reports.** All persons affected by this order shall execute and file with the War Production Board such reports and questionnaires as the War Production Board shall from time to time prescribe.

(d) **Violations.** Any person who wilfully violates any provision of this order, or who, in connection with this order, wilfully conceals a material fact or furnishes false information to any department or agency of the United States, is guilty of a crime, and upon conviction may be punished by fine or imprisonment. In addition any such person may be prohibited from making or obtaining further deliveries of, or from processing or using material under priorities control and may be deprived of priorities assistance.

(e) **Communications.** All reports to be filed and other communications concerning this order should be addressed to War Production Board, Aircraft Production Board, Washington, D. C., Ref.: L-262.

(P.D. Reg. 1, as amended, 6 F.R. 6680; W.P.B. Reg. 1, 7 F.R. 561; E.O. 9024, 7 F.R. 329; E.O. 9040, 7 F.R. 527; E.O. 9125, 7 F.R. 2719; sec. 2 (a), Pub. Law 671, 76th Cong., as amended by Pub. Laws 89 and 507, 77th Cong.)

Issued this 26th day of January, 1943.

Director General for Operations.

Tonight's lesson for Japs

...subtracting Zeros

A great guy takes off, and a headline is in the making . . . a headline about courage and spunk and Army Bell Airacobras that help him shatter Jap Zeros into "kingdom come." From General MacArthur's Headquarters, Australia, October 12th (A. P.) comes news of the citation for "gallantry in action" of this Army Pilot:

> Capt. Mainwaring was leading a flight of Airacobras over New Guinea on May 29 when one of his planes was attacked by eighteen Jap fighters. Turning back he shot down the leader of the enemy formation and scattered the others. He then reformed his own group and made a co-ordinated attack, destroying three more and possibly shooting down two others.

Under control of the Airacobra pilot is one of the world's hardest-hitting fastest-moving one man arsenals. Forward is a powerful cannon. Flanking him are heavy machine guns. Around him is protective armor and behind him is an outstanding record of Airacobra success in combat.

The day is coming when Allied Victory will end this war. An advanced world of air-borne commerce will follow. Then, all of our engineering skill and resources will turn from the needs of war to building planes for the needs of Peace. © Bell Aircraft Corporation, Buffalo, New York.

Airacobras for victory—

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Send 10¢ for "Men and Wings"—a fascinating 96-page history of aviation by Assen Jordanoff. Airplane Division, Dept. M., Curtiss-Wright Corp., Buffalo, N. Y.

FIRST
Since the Birth of Aviation

1932 • The first Curtiss plane designed specifically as a fighter-bomber . . . a single seater, it was used by the U. S. Navy for operation from aircraft carrier.

1937 • First fighter-bomber to use retractable landing gear—used by the Navy and by China, Argentina and Siam. Wing bombs were also carried.

1938 • The Hawk 75 . . . a monoplane fighter-bomber, incorporating heavier defense armament, increased maneuverability and carried a greater bomb load.

1940 • Curtiss P-40 Tomahawk . . . equipped the R. A. F. in the middle East and the American Volunteer Group in China, Java and Burma.

Ack-Ack guns that "see, hear, and think"

MEN who man our anti-aircraft batteries swear that their ack-ack guns can "see, hear, and think." Here's why:

In case of a night air raid, the first ears to hear the enemy bombers are mechanical ones in the Sound Locator developed and continually improved by Sperry. Far more sensitive and reliable than human ears they can locate enemy planes while they are still many miles away and determine their exact position and the direction of their flight.

When the "ears" have found the planes, the "eyes" of the ack-ack guns take over. A battery of 800 million beam candle-power searchlights, the most powerful in the world, spotlights each enemy raider *automatically*. So brilliant is the light of this Sperry invention that a man miles away can read a newspaper by it.

While the reaching finger of the searchlight follows the plane across the sky, the "brain" of the guns goes to work. This is another Sperry device, the Universal Director.

Working many times faster than the human mind, this uncanny instrument calculates firing data and transmits them to the anti-aircraft guns electrically. Then a Sperry power control mechanism automatically positions the guns on the target.

The last act in this amazingly swift-moving drama comes when the men slam home the shell and press the firing lever. Which they do. And enthusiastically!

Creating "eyes, ears, and brains" for anti-aircraft guns is but one of the many ways in which Sperry is co-operating with our Army and Navy, and helping through precision engineering to solve the problems of a nation at war.

Sperry Gyroscope Company, Inc.
Brooklyn, New York
Division of Sperry Corporation

SPERRY

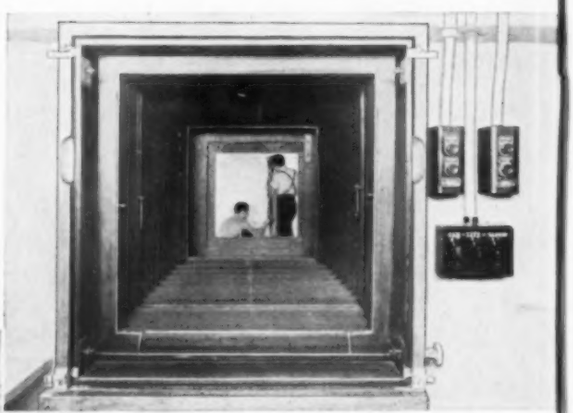
PRECISION ENGINEERS TO AMERICA

These Martin Firsts help make

U. S. AIRCRAFT

SECOND TO NONE!

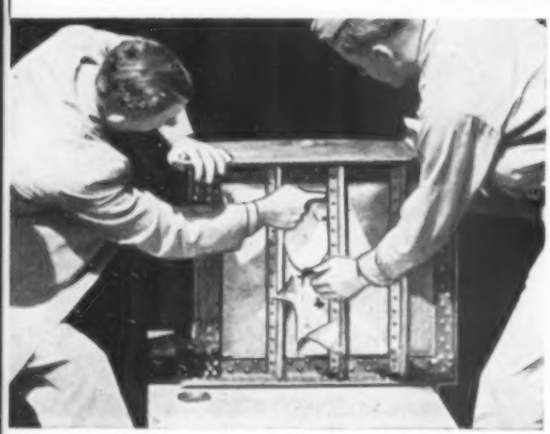
FIRST all-plastic aircraft nose, used on the Martin B-26, giving bombardier full visibility and absorbing recoil of forward gun. Martin was working on plastic noses and other parts as far back as 1921. Today some Martin types contain 400 plastic parts.



FIRST to develop photo-layout method, utilizing giant camera. Through this method, scale photos are reproduced directly on sheet metal, thus speeding production. Moreover, drawings may be scaled up or down swiftly, accurately.

FIRST to develop "heat therapy" for airplane wings. A giant heating "pad" is applied to aluminum covering of wing, expanding this "skin." Riveted when hot, skin shrinks when cool, fits tightly over spars without wrinkling or buckling.

FIRST U. S. power-operated gun turrets, giving our bombers strong protection against enemy interceptors. Martin manufactures these turrets not only for Martin bombers but also for many other types of American aircraft.



FIRST U. S. self-sealing fuel tank. Martin Mareng tanks are now standard equipment on many American aircraft. Martin experiments on self-sealing fuel tanks date from 1919, during which period over 285 different materials were tested.

These are only a few Martin "firsts." Some are still close-guarded military developments, while numerous others, individually minor but collectively important, are in use throughout the aviation industry. But Martin engineers are never satisfied. In scores of diverse fields, work goes on to give America even mightier planes for today's aerial fights, tomorrow's peacetime flights.

Martin

AIRCRAFT

Builders of Dependable Aircraft Since 1909

VICTORY IS EVERYBODY'S BUSINESS

This is not just a man's war—winning it is everybody's business. Men and women workers are sharing equally in the responsibility and the credit for the results accomplished in America's war production program.

At Solar Aircraft this sharing of the production burden has contributed much. It has, in a large measure, made it possible for Solar to produce unprecedented numbers of "anti-monoxide" exhaust manifolds for America's fighting airplanes.

ARMY E NAVY

SOLAR

EXHAUST SYSTEMS—

SOLAR AIRCRAFT COMPANY ★ SAN DIEGO, CALIFORNIA

Call it Lightning!

– SAY THE PILOTS

NOBODY had time to name this Lockheed fighter plane when it was born. They just called it by a number, P-38.

Then the pilots sent it climbing over eight miles straight toward the stratosphere, up where even the highest-flying bombers couldn't go. They brought it screaming down out of the clouds like forked vengeance. They jammed down the throttle and it flew faster than any fighter ever flew before. They pressed the trigger-button and saw how *concentrated* fire-power from its cannons and machine guns could rip apart anything on wings—and there was only one name for it: *Lightning.*

So that's its name, a name it earned from British and American pilots alike, a name to watch: Lockheed *Lightning.* Lockheed Aircraft Corporation . . . Vega Aircraft Corporation . . . Burbank, California.

for protection today, and progress tomorrow, look to

Lockheed

FOR LEADERSHIP

Member Aircraft War Production Council, Inc.

Copyright, 1943, Lockheed Aircraft Corporation

"Everybody talks about the weather . . .

. . . but nobody does anything about it." No longer is this famous old quotation true. For Boeing engineers *have* done something about it!

They designed the Stratoliner*—the only transport airplane built to fly in the substratosphere, *above* the weather—where the air is thin, but smooth—where greater speed, safety, passenger comfort, and economical operation are possible.

In order to open up this new superhighway of the air, Boeing engineers designed the first cabin with automatically controlled atmosphere-conditioning. Thus at 20,000 feet, where the bitter-cold air is too rarefied for sustained breathing, the atmospheric "altitude" inside the Stratoliner is maintained at a level at which passengers and crew are comfortable. That's why the Stratoliner represents the greatest advance yet reached in the design and manufacture of commercial airplanes . . . and a guidepost to the future of flight.

Today, Boeing Stratoliners have discarded their gleaming mufti for drab camouflage, and employ their great speed and huge load capacity on errands of war . . . shuttling across seas and continents, hurrying men and materials out to the front lines.

And in another way, too, the Stratoliner is helping to win the Battle of the Skies . . . supplementing the work of another Boeing-designed and Boeing-built airplane—the Flying Fortress.* For the engineering and manufacturing lessons learned in building the Stratoliner and the Fortress are today being applied to creating still better military planes.

The engineering and production know-how acquired by Boeing in many fields—structural, electrical, metallurgical, aerodynamic and many others—this know how will some day be converted . . . from making America victorious, to making the fruits of science and industry available to free men everywhere.

Engineering leadership . . . manufacturing efficiency . . . now and tomorrow, these are implicit in the phrase "Built by Boeing."

DESIGNERS OF THE FLYING FORTRESS • THE STRATOLINER • PAN AMERICAN CLIPPERS **BOEING**

*THE TERMS "FLYING FORTRESS" AND "STRATOLINER" ARE REGISTERED BOEING TRADE-MARKS

Sixth sense for Heroic Airmen

For the pilot speeding through storm and fog, absolute control over attitude and heading is vital. Yet with vision obscured, sense-reaction to yaw and bank can become confused . . . may possibly lead to disaster. Hence the need for a dependable, sensitive instrument such as the "PIONEER" Turn and Bank Indicator.

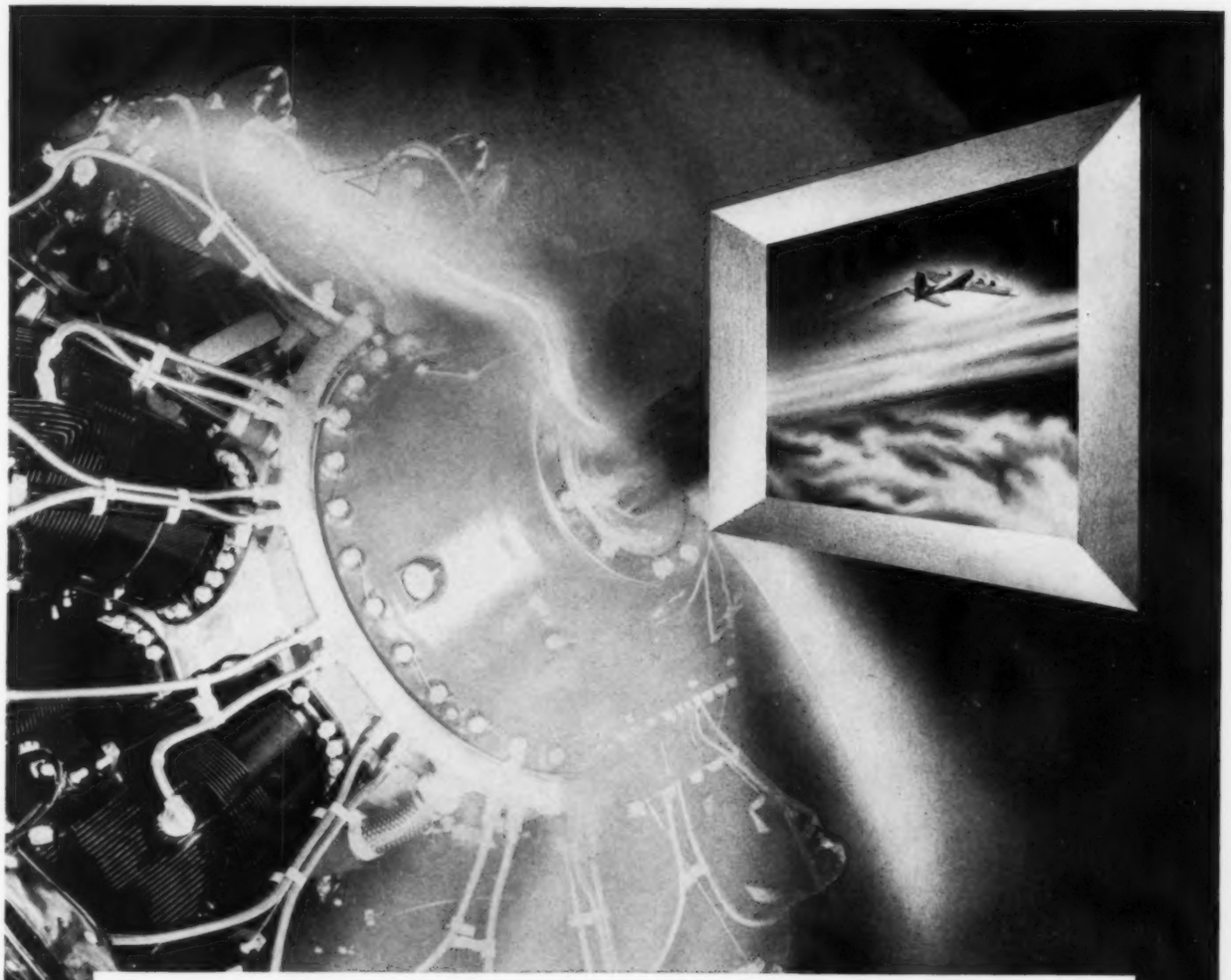
This fine example of advanced engineering shows the pilot, flying on instruments, the slightest deviation from his planned heading and lateral positioning. At all times an important adjunct to aircraft manipulation, the "PIONEER" Turn and Bank Indicator is a rate instrument . . . and thus aids in the execution of precision, *timed* turns. Also, whether visibility is zero or unlimited, its combination of the two instruments in a single case facilitates coordination of turn and bank movements.

Along with many other "PIONEER" flight, navigation and engine instruments, the Turn and Bank Indicator . . . vital "sixth sense" for our fighting fliers . . . is being produced in impressive quantities by the men and women of Pioneer.

"PIONEER" Aircraft Instruments are vital members of "The Invisible Crew" . . . precision instruments, and controls, which 25 Bendix plants from coast to coast are speeding to our fighting crews on world battle fronts.

THE INVISIBLE CREW
Precision Equipment by Bendix
AVIATION CORPORATION

PIONEER INSTRUMENT DIVISION



Roaring Power for Rarified Realms

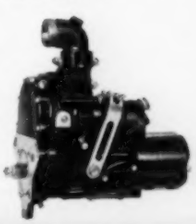
HIGHER AND HIGHER into the heavens roar American fighters and bombers. The better to blast the enemy, they seek new and unscaled heights. And on "BENDIX-SCINTILLA" Aircraft Ignition depends in part their success.

For in the freezing half-twilight and thin realm of air above earth, electricity does strange things. Yet high-voltage current must be created and controlled . . . to fire accurately-timed sparks for pulsing engine power.

Engineered into "BENDIX-SCINTILLA" Aircraft Magnetos, Harnesses and Switches to meet increasingly stringent needs are constant, vital improvements, that aid our march to Victory. Some day they will be employed in conquering new realms of space and time for the peacetime progress of Aviation.

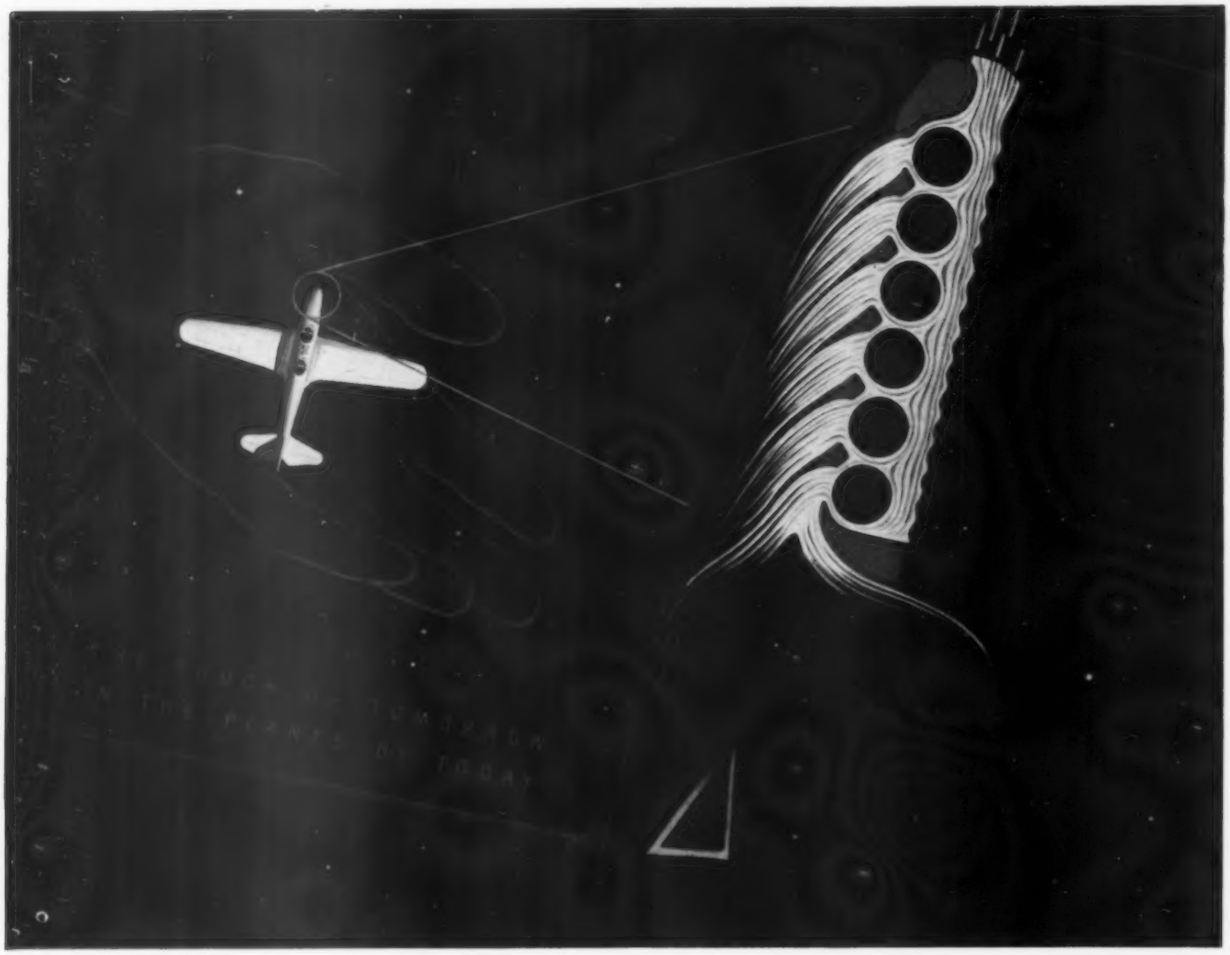
THE INVISIBLE CREW
Precision Equipment by
Bendix
AVIATION CORPORATION

"BENDIX-SCINTILLA" Aircraft Ignition Systems are important members of "The Invisible Crew" . . . precision instruments, and controls, which 25 Bendix plants from coast to coast are speeding to our fighting crews on world battle fronts.



BENDIX SCINTILLA

THE WORLD'S FINEST AIRCRAFT IGNITION



Ranger Solves the In-Line Air Cooling Problem

A scientifically engineered air-scoop, baffle, and air pressure "reservoir" arrangement delivers uniform air pressure at each cylinder, maintaining uniform temperatures in all cylinders at all times.

When Fairchild began its researches into the air-cooled, in-line aircraft power plant, it began "from scratch." The formidable difficulty of air-cooling cylinders which were set one behind another had discouraged many. Interest had been diverted to radial air-cooled and liquid in-line design. Fairchild believed that the tremendous advantages of air-cooling combined with those of inverted, in-line arrangement were vital to this country's aeronautical progress. Fairchild spent a decade in the laboratory developing such an engine type . . . the Ranger. A simple yet amazingly efficient method of "pressure cooling" solved the primary problem. Today—the only engines of their kind in America—Ranger air-cooled, inverted, in-line engines are powering the planes of the United Nations. They are the most efficient and reliable engines in their power class. They not only justify in every respect the years spent in their development but, as with all Fairchild achievements in the science of aeronautics, they bear the unmistakable Fairchild "touch of tomorrow." Continuing researches demonstrate that they are the beginning of a new and brilliant chapter in aircraft engines and the planes which they make possible.

ON THE BEAM

"This government, the offspring of your own choice, . . . has a just claim to your confidence and your support." George Washington

RANGER AIRCRAFT ENGINES

Division of Fairchild Engine and Airplane Corporation · Farmingdale, Long Island

Actual Evidence That We Are Helping the United Nations finish the job!

Precision has ALWAYS been a basic characteristic of E. L. I. products. Today, our resources of equipment and skill are achieving remarkable production records in the manufacture of vital aviation equipment, *forecasting E. L. I. products of the future.*

Engineering Laboratories, Inc.

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TULSA, OKLAHOMA, U. S. A.

EQUIPMENT IN WORLD-WIDE USE

Throughout the past eleven years, E. L. I. as one of the largest geophysical research organizations in the World has contributed many instruments and developed services vital to the Petroleum Industry.

Three-fin tail arrangement (above) and cambered fuselage (opposite page) are important aerodynamic features of the Constellation.

THE CONSTELLATION

By TOM ASHLEY

Converting bombers to post-war airliners has long been talked. But who ever heard of converting a fighter for freight? Lockheed has magnified many of the sensational features of the P-38 for utilization in the big but practical Constellation. Test-flown recently, it is attracting attention with its surprising efficiency.

AT a top speed comparable with the cruising pace of fighter planes it will fly a light tank and its complement of troops across an ocean. Faster than the Japanese Zero or any four-engined bomber now in service, it will cross the continent in less than nine hours.

These are a few of the claims made by Lockheed for its newest prize — the triple-tailed, four-motored Constellation, which recently passed its flight tests with flying colors.

"Big but practical" is the description of the shark-shaped airliner designed and built for Transcontinental & Western Air, Inc., and turned over by the airline to the Army Air Forces for wartime duty. It has several greatly-magnified features of the P-38 and a fuselage with a slight fore and aft chamber to obtain aerodynamic efficiency. Unique engine nacelles and cowlings are used to cool the four 2,000-horsepower Wright radial engines with no more "drag" than the Lockheed '14 required for 800-horse motors. Each of the engines can be changed in forty-five minutes instead of the full day once required.

High Efficiency Cited

Lockheed says the Constellation, cruising at half power, is 100 miles per hour faster than standard airliners and could carry sixty passengers from Los Angeles to New York for less than railroad rates. Carrying fuel for long-range travel, it can accommodate fifty-five passengers and a crew of nine. The cabin is pressurized for "over weather" flying and "can rise comfortably" to 35,000 feet. New travel routes across the top of the world will be furthered by the Constellation's ability to maintain flight at 25,000 feet on three engines and at 16,500 feet on two engines.

Big as it is, the Constellation's speed, range and load-lifting ability all are inherited directly from the P-38. Its wing is an enlargement of the Lightning's, embodying the same high lift, low drag characteristics. It permits full use of Fowler flaps, which reduce the landing speed to seventy-seven miles per hour, and also a new "maneuvering" flap, making possible three

distinct sets of performance characteristics: (1) With flaps telescoped into the wing, the Constellation obtains maximum speed and range; (2) with the "maneuvering" flap the lift is increased to allow rapid climb out of a short field or safety maneuvers at slow speed, and (3) with landing flap, it can slow down for short landings.

Hall L. Hibbard, Lockheed vice president and chief engineer, advanced the Constellation's design, which was perfected by a staff of engineers headed by Hibbard and C. L. (Kelly) Johnson, chief of research.

As a result of more wind tunnel and structural testing probably than any other airplane, the Constellation embodies many new designs, structural and safety features. More than five hundred wind tunnel tests have been made during the course of development.

The Lockheed Structures Research Laboratory contributed invaluable tests and findings to the development of the cabin supercharger installation, and all of the controls necessary for its fireproof nacelles and cowling of stainless steel in which fire may burn for half an hour without interfering in any way with the operation of the airplane.

The aerodynamics group contributed many important new features including a cambered, perfect circle fuselage which aids rather than retards the high lift attained by the long wing, and also a new design nacelle which cuts down drag so successfully that the Constellation with 2,000 horsepower in each nacelle has no more drag than the Lockheed Model 14 transport, 17,500 pounds gross weight, had with 800 horsepower.

Specifications and performance details of the Constellation are restricted by Army authorities at present, but following is a general summary, furnished by Lockheed, of the engineering design, structural and aerodynamic features of this important addition to America's air forces.

The Constellation Wing

The Constellation wing was developed as a result of tests on the Lockheed Lightning P-38 wing, and seems to be the best compromise between a low drag wing and a high lift wing. It has, like the Lightning, particularly good stall characteristics, which is a very important factor in transport airplanes.

During the course of development of this wing, several comparative types were tested in the wind tunnel. Included in these types were the so-called laminar flow wing sections, which leave very little wake or eddy behind the wing. It was determined during these tests on laminar flow sections that while they would have good drag characteristics, they were not particularly well suited to a transport airplane because of sensitiveness to roughness that might be caused either by ice formations or by mechanical abrasion due to walking on the wings, or to the roughness of de-icer boots.

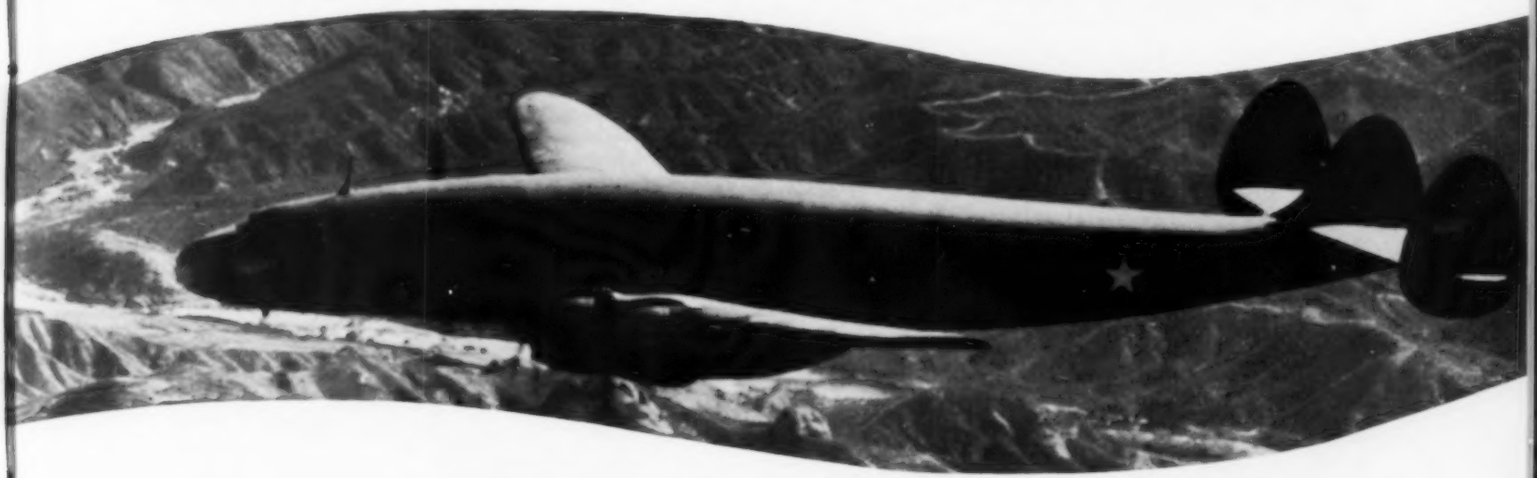
As a result of comparing all of the various factors involved in the selection of wing sections, the type that is currently incorporated in the Constellation design seems to have the best all-around characteristics. This wing is an NACA section having no aerodynamic twist. It is, in effect, an enlargement of the Lightning wing.

The value of a wing section cannot be determined solely upon its own characteristics but must be evaluated in conjunction with its operation when using Fowler flaps. Some types of wings, when considered by themselves, neglecting flaps, can be shown to be superior to the type of wing used for the Constellation. Inasmuch, however, as one of the basic considerations in the design of a transport airplane is the landing speed, the effect of high lift devices on the wing section chosen is of paramount importance.

The Engine Nacelles

The Constellation airplane is primarily a high performance transport, but is so readily adaptable in many different versions or modifications to military usage that every one which comes off the line for the duration probably will be used by or for the Air Forces in some manner directed toward hastening the final victory. Since it is designed primarily for high cruising speeds at high altitude (with possibly fifty-seven people aboard, including crew of five), the aerodynamic problems of the Constellation are similar to those of the design of a pursuit type airplane.

The contour of the engine nacelles is specifically designed to avoid compressibility shocks on the nose cowl and must at the same time develop sufficient pressure drop to cool adequately the air-cooled engines in low



operation in maintaining within the cabin conditions of 8,000 feet while the plane is actually flying normally above the weather at 20,000 feet.

Other contributions of Structures Research and other groups working in close collaboration include exterior spotwelding on 75 per cent of the fuselage and 10 per cent of the wings; hot wing de-icing; a complete hydraulic mock-up duplicating in exact size the entire functional mechanism of the airplane; an ingenious interchangeability arrangement whereby a complete new power plant may be installed and ready for flight in forty-five minutes; a radically new electrical system, which includes the most advanced method of instantly locating and extinguishing fire yet devised, and

UNUSUAL EFFICIENCY of Constellation is demonstrated by its landing speed of only 77 miles per hour. Full-play Fowler flaps and a new "maneuvering" flap are used.

speed climb. The range of speeds for which the cowl must be designed is therefore comparable to the range of speeds common to the design of pursuit type aircraft. In the design of the Constellation airplane, it has been necessary to make wind tunnnel tests up to speeds of many hundreds of miles per hour, since these speeds could be obtained in glides from high altitude during the course of operation.

The design of the Constellation cowling is characterized by the small inlet area and the gradual and continuously increasing radius from the nose back to the maximum section of the cowling. The gently increasing radius of the nose cowl allows a uniform acceleration of the air stream around the nacelle and consequently eliminates extremely high velocities over any one part of the cowling.

Interchangeability

The power plant installation has been designed with particular emphasis on the maintenance and serviceability aspects. In order to achieve this, particular attention has been paid to the use of interchangeable engine installations, quick disconnect of all electrical and plumbing lines at the firewall and the design of oil cooler flaps, cowl flaps, carburetor ducts, etc., as integral assemblies. It is therefore possible to make a complete engine installation in approximately forty-five minutes by changing the complete power plant assembly forward of the firewall.

The following specific parts are jig built on production airplanes to insure they may be exchanged from one airplane to another in service: wing tip, aileron, wing flap, all trimming tabs, stabilizer, elevator, all parts of the exhaust disposal system, all seats and berths and equivalent parts, fin, rudder, outer and inner wing panels, landing gear, all removable cowling, all engine cowls, all carpets, including fastening.

Every effort has been made to reduce the number of left and right hand parts to a minimum. The following parts are identical, so that they may be used either right or left: removable engine mounts, exhaust collector rings, stack and tailpipe back at least to vicinity of firewall, engine cowls, removable nacelle cowling, elevators, landing gear wheels, brakes and retracting mechanism up to the attachment to the main structure.

The Fuselage

The unique appearance of the Constellation fuselage is the result of several considerations of design. In the first place, it was desired to obtain a fuselage contour such that the lift distribution over the wing should be only slightly affected by the presence of the fuselage. This was partially obtained by the design of the Constellation fuselage which resembles an airfoil in some respects.

Since the cabin of the Constellation is pressurized, it was advisable to use circular cross-sections throughout the length of the fuselage. The use of circular sections, however, tends to impose difficulties upon the design of the flooring if the optimum width of flooring is required in order to accommodate the greatest possible number of passengers. Cambering the fuselage center lines tends to give an optimum floor arrangement which is of value in providing seat space and berth width, particularly in the nose and tail sections.

A further advantage incidental to the cambered fuselage is the material shortening of the nose wheel strut, saving several hundred pounds of landing gear weight.

Arrangement of Fuselage Interior

The flight station is located in the forward upper portion of the fuselage. The pilot's seat is located on the left, co-pilot on the right. Flight engineer sits behind the co-pilot, facing outboard. The radio operator sits behind the pilot, facing forward.

Aft of the flight station and separated therefrom by a bulkhead and curtain, are provided a navigator's station and accommodations for the crew. Aft of the navigator's station and crew's quarters, and separated therefrom by a bulkhead and door, space is provided for cargo on the right side and communicating equipment on the left side.

(Continued on page 30)

INHERITED FROM A-35, features of high speed, long range and load-lifting ability are combined to make the Constellation "big but practical." The pressurized cabin is an advancement over previous conditioning systems.

Even on runways hacked out of the jungle

AEROL landings are always safe!

★ In today's global warfare, Aerol landing gear is serving on such diverse terrain as the steppes of Russia, the scorching sands of North Africa and emergency fields roughly hewn in the wilderness of the South Sea Islands.

In every case Aerols are performing superbly, insuring safe, smooth landings and take-offs that protect the plane and crew.

The splendid performance records now being established by Aerols on world-wide battle fronts are but a continuation of their earlier, peacetime accomplishments. Their success also offers sound evidence that Aerols will do an equally outstanding job in the almost limitless future of after-the-war aviation.

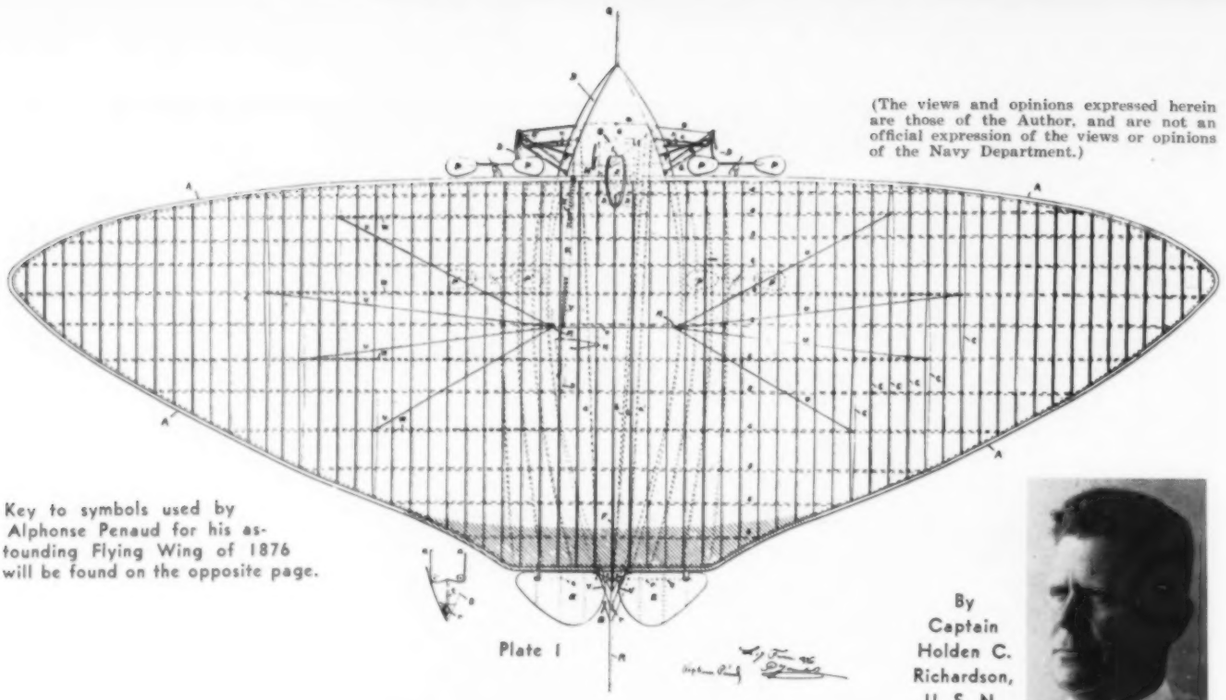
THE CLEVELAND PNEUMATIC TOOL COMPANY
AIRCRAFT DIVISION • • **CLEVELAND, OHIO**

Also Manufacturers of Cleco pneumatic tools for the aircraft and general industry, Cleco sheetholders, Cle-Air shock absorbers for trucks and buses, and Cleveland rock drills for mining and construction work.

AEROLS*

*THE SHOCK ABSORBING UNITS ON AN AIRPLANE'S LANDING GEAR; THE NAME IS DERIVED FROM THE WORDS "AIR" AND "OIL"—THE FLUIDS USED TO DISSIPATE THE LANDING SHOCKS

(The views and opinions expressed herein are those of the Author, and are not an official expression of the views or opinions of the Navy Department.)



Key to symbols used by Alphonse Penaud for his astounding Flying Wing of 1876 will be found on the opposite page.

Plate I

By Captain Holden C. Richardson, U. S. N.

PROPHECY IN RETROSPECT

Today's sensational Flying Wing dates back to 1876. Alphonse Penaud patented long ago many of the principles and methods now exploited for high-performance design. Here's his formula.

BISHOP Milton Wright, back from a trip abroad, brought with him for his two boys an ingenious toy he picked up in France—a helicopter, it was called.

It was a couple of screws, or propellers, made of stiffened paper, separated by a slender and very light frame. One was fastened rigidly to the frame, the other revolved freely. It used twisted rubber bands for power, and when wound would rise vertically to the ceiling, remaining there until the power weakened and it began descending.

A boy today would find it an interesting and amusing toy, although it hardly would impress him as anything particularly remarkable. But it has been more than a half-century since the Bishop ran across the then-extraordinary gadget and brought one back for the amusement of his sons.

And his purchase of the toy had extraordinary results, for his sons were Wilbur and Orville Wright, and it was this helicopter that first turned their interest seriously to the problems of realizing man's age-old dream of flight. The helicopter was not merely a toy—it was a replica, somewhat modified, of a working model developed by a neglected genius and pioneer of aviation in formulating his theories of aerodynamics.

Alphonse Penaud was the name of this all-but-forgotten individual. Sick, disappointed and despondent, he died by his own hand sixty-two years ago. In his brief and tragic life, he had not only sifted and correlated the work of his predecessor dreamers of wings for man—it is to Penaud that we owe the re-discovery of the father of British aviation, Sir George Cayley—but he had developed his own theories of aerodynamics, embodying them in small models that achieved flight, and ultimately in a remarkable design patented in 1876 for an airplane which, in retrospect, is astounding in its use of principles and methods employed in planes today.

Penaud has not been entirely without honor, but his major contributions to the science of flight were not recognized in his own time or since. The usual reference works will be searched in vain for any but the barest reference to him, and even specialists in the history of aviation are unaware of his work. Several times in recent years inventors who thought they had discovered something new in aviation have been convinced at last in the courts that Penaud patented the idea years ago.

There is, of course, nothing new at all about the desire to fly, the dream of flight. Men have wanted to give themselves wings since long before the desire created the legend of Daedalus, the architect who fashioned wings for himself and his son, Icarus, to escape from Crete and the wrath of King Minos.

Penaud himself said that Pliny, in the days of Rome's grandeur, figured out something of the principles of gliding. Hundreds of years later, but still more than 400 years ago, Leonardo da Vinci toyed with the idea of mechanical flight. A century or more later, in 1650 or thereabouts, Francesco de Lana got the completely erroneous notion that he could get a boat into the air for a new kind of sailing by suspending it from four huge, hollow copper spheres, and then exhausting the air from the spheres with a vacuum pump.

But men continued to experiment and to think about flight, and occasional individuals came nearer and nearer the solution. In the last cen-

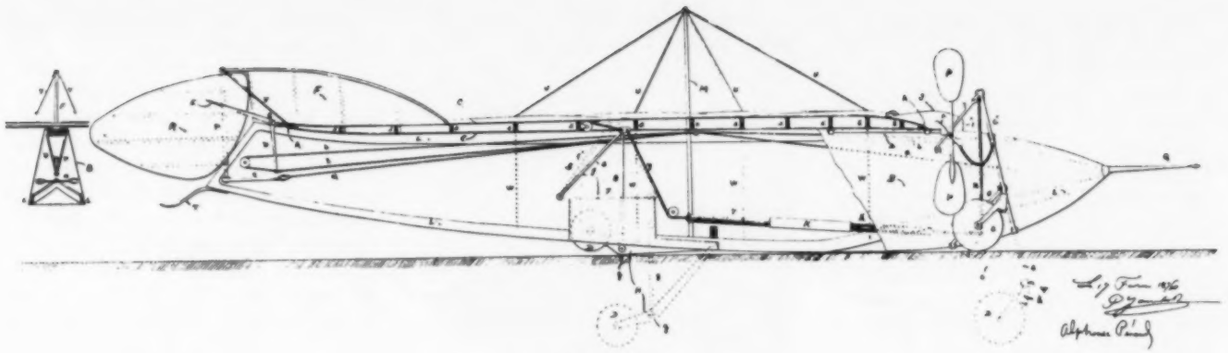


Plate 2

tury real progress began to be evident, and in 1876 Penaud turned up with a design for a twin-tractor, high wing, amphibian monoplane with retractable landing gear, variable-pitch metal propellers and dozens of other features of present-day aircraft. But that's getting ahead of our story.

Aviation is still a baby industry, aerodynamics an infant among the sciences. Inventors and designers today, quite aware of the imperfections of our airplanes and the compromises which alter ideal flight forms in order to achieve mechanical flight at all, dream and work toward the aircraft which will eliminate all parts that do not contribute directly to sustentation, propulsion and control, and to accommodation of crew and cargo—the plane in which every part is devoted to the purpose of efficient flight.

The requirements for efficient flight are not only efficient sustentation, but stability and absolute controllability of flight attitudes under all circumstances, and in turbulent as well as in calm air. It requires efficient propulsion — the airplane gets it from a power-driven propeller. The power plant can be accommodated in the wings or body easily enough, but cooling the engine and its lubricant is still troublesome — witness the recent controversy over the relative merits of in-line water-cooled engines and radial air-cooled engines.

The ideal flight form, of course, is most closely approximated in birds, in which the body contains the power plant, the wings combine the sustaining propulsive means, and the wings

ALPHONSE PENAUD (1850-1880)
(From Histoire De L'Aeronautique)

and tail provide stability and control. The legs and feet provide for take-off and alighting, and are either retractable or stream into the line of flight.

Gliders afford our closest approach to the form of birds which soar with fixed wing attitudes, but the fixed wing lacks the dynamic power of propulsion and control of attitude inherent in the deformable wings of all types of birds. In airplanes, the warpable wing or wing with ailerons or the like is a poor substitute for the birds' variable area, variable aspect ratio, variable camber, variable dihedral and variable incidence, independently or

(Continued on page 39)

KEY TO DRAWINGS

PLATES 1, 2, 3

A, A	wing margins
B	nacelle
C, C, C	cap strips
D, D	disc wheels
E, E	elevators
F	fin
G, G, G	forward chassis
H	rear chassis
I	glass window for pilot
J	cockpit cover for pilot
K	shock absorber housing
L, L, L	longerons
M, M	king posts
N, N, N	troughs
O	handle bar
P, P, P	propeller blades
P′, P′	Propeller blades alternate location
Q	indicator spar
R	rudder
S, S, S	spars
T	tail skid
U, U, U	upper truss wires
V, V, V	rudder post braces
W, W, W	lower truss wires
X, X	forward shock absorber and lead
Y, Y	after shock absorber and lead
a, a	rudder control leads
b, b	elevator control leads
c	control post
d	transverse axis of control post
e, e	elevator axis
f	radius rod, rear wheel
g	strut rear wheel
k, k	caster mounting, front wheel
r	rudder axis
s	propeller shaft
t	tiller bar, rudder
v, v	tiller bars, elevator
x	load wire, forward chassis
y	load wire, rear chasis
z	shoe on knuckle, rear chassis

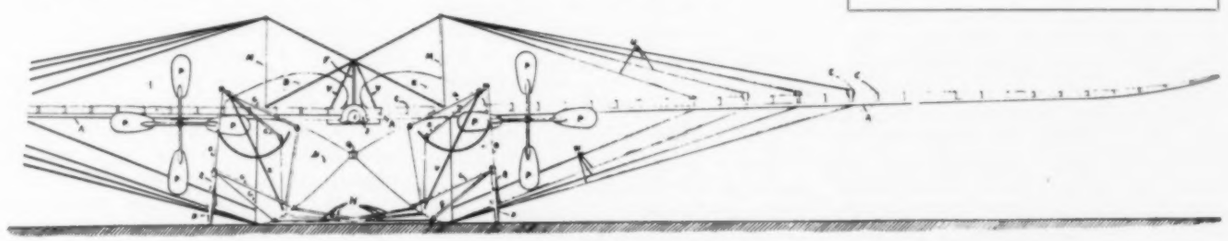


Plate 3

Commands, the Squadron Commander and his Squadron Staff may function as the Squadron Board. The Wing Board shall be composed of the Wing Commander and his Wing Staff. A Task Force Board shall be composed of the Task Force Commander and not less than two or more than four of the officers next in rank under his command. The National Board shall be composed of the officers assigned to duty at National Headquarters. Such Commanders and Officers now serving or hereafter appointed to these posts are hereby designated by the National Commander as ex-officio members of said Boards. Three members of such a Board shall constitute a quorum thereof. A Board shall meet within one month of the filing of a case before it.

9. For the discharge of a member other than a Wing, Group, or Squadron Commander, or a member of an active-duty Task Force under the jurisdiction of National Headquarters, the Group Board has first jurisdiction, or the Squadron Board in a state where no Group exists. The case for discharge shall be filed in writing by the Commander of the Squadron to which the member is assigned. If the member is on a Group Staff, the case shall be filed with the Group Board by the Group Commander and if on a Wing Staff by the Wing Commander with the nearest Group Board. The member shall be notified in writing as to the pending action and the time of the hearing. The case for discharge shall be presented either in person or in writing by the Commander, or unit Staff Officer deputized by him, of the unit to which the member is assigned. The member may answer either in person or in writing. Both sides may call witnesses.

10. If the Group Board, by majority vote, decides on discharge, a written report, stating whether the discharge is honorable or dishonorable and citing the reasons, shall be transmitted within ten days to the Wing Board for review. A copy shall be sent to the member with due notice of the time when the Wing Board will meet on the case. Procedure as to receipt of oral or written testimony and as to appearances will be the same as for the Group Board. Action by majority vote of the Wing Board will be final. If the vote is for discharge, the Wing Commander shall send a copy stating the decision and the reasons, to the member, to the member's commanding officer, and to National Headquarters. The member's service record and identification card shall thereupon be returned to National Headquarters.

11. In the case of a member of a Task Force outside the jurisdiction of a Wing Command, the Task Force Board shall hold the first hearing and send its findings to the National Board of Review, with proceedings same as above outlined.

12. In the case of a Squadron or Group Commander, the Wing Board shall have first jurisdiction and send the findings to the National Board. The case of a Squadron Commander shall be brought by his Group or Wing Commander and of a Group Commander by his Wing Commander. In the case of a Wing Commander, the case shall be brought by the Regional Commander to the Wing Board in a nearby state and the findings sent to the National Board of Review.

Subject: Civil Air Patrol Cadets. (G.M. No. 58)

1. To extend the opportunities for service in the Civil Air Patrol to young people of the United States, there is hereby authorized within the scope of administrative Order No. 23 of the Office of Civilian Defense establishing the Civil Air Patrol, a grade of membership to be designated as "Cadet" which will be junior to regular membership in the Civil Air Patrol.

2. Membership as Civil Air Patrol Cadets (CAPC) will be limited to students in good scholastic standing in the last or next to last year of senior high school who are native born Americans whose parents meet the citizenship requirements for membership in CAP. All cadets must be physically fit.

3. Total membership in CAPC in any area will not exceed the total active regular membership of CAP in that area. Each male member may sponsor for membership in CAPC the young man of his acquaintance he thinks most likely to succeed in aviation and the sponsoring member will be personally responsible for the training of his recruit. Likewise each female member of CAP is authorized to sponsor one young woman. For each squadron of CAP there is authorized a counterpart squadron of CAPC, and for each flight of CAP a counterpart flight of CAPC. The composition, training and operations of CAPC units will be governed by the same directives used by CAP except that the Cadets will not be assigned to flying duty, and except as modified by CAPC directives issued by CAP National Headquarters.

4. General direction of each CAPC unit will be the Commanding Officer of its parent CAP unit but the cadets will manage their own affairs to the fullest extent consistent with good results. On formation of a CAPC unit, provisional command officers will be appointed by the CAP unit commander and training will start at once. When the CAPC unit has progressed sufficiently, it will elect its command and staff officers to be confirmed by the CAP unit commander and will fill subsequent vacancies by election. At the option of the parent CAP unit, drill, classes and field exercises may be held separately from or combined with those of the CAP.

5. Applications for membership will be executed in duplicate and will be accompanied by three full-face passport photographs of the applicant, 1½" by 1½". The parent CAP squadron, or the Flight in a community organized under a flight command, will receive one copy of the application and one photograph. The CAPC unit will receive the other copy and one photograph and the third copy will be attached to the cadet's identification card to be issued by the CAP unit commander. On completing basic ground training and graduating from high school, cadets will be eligible for full membership in CAP.

6. The uniform for CAPC will be: plain khaki shirt without shoulder loops, khaki trousers or khaki skirt for girls; belt with plain buckle; tan socks; plain tan shoes; and overseas cap prescribed for CAP. Any suitable outer garment may be worn. Insignia similar to those of CAP will be specified. Every squadron and flight of CAP is urged to take prompt action in organizing a counterpart unit for the young people of its community.

No. 60. Requests for Membership Lists.

1. It has come to the attention of Headquarters that various requests have been made direct to Wing, Group or Squadron Commanders for lists of pilots or other personnel. Varying reasons have been given in requesting these lists.

2. In the future, any requests for lists of names and addresses, qualifications of

THE CONSTELLATION

(Continued from page 26)

The main passenger compartment is located aft of the cargo spaces and is separated therefrom by a bulkhead and lockable door. Arrangement of this compartment varies according to the use that is to be made of each individual airplane and depends on the number of passengers to be carried, weight of cargo aboard, non-stop range desired and whether the plane is to be used at normal cruising speeds or wide open to rush troops or equipment at full throttle to some outpost where a sudden emergency arises.

For example, the Constellation is designed to carry fifty-five passengers and a crew of nine from Los Angeles to New York in record time.

In one arrangement of the passenger compartment, seats could possibly provide for sixty passengers as follows: on left side of an aisle, four folding four-place benches; on right side, eleven rows of four seats each, facing alternately forward and aft. The seats on right are convertible in flight to provide berths for twenty-two passengers.

Food lockers are installed at after end of the main passenger compartment. There are eight windows, four on each side of the cabin, in the prototype airplane, although number of windows varies according to the seating arrangements of the various models soon to be in production.

Aft of the passenger cabin and separated therefrom by a curtain are lavatory facilities.

Passenger entrance is located on the left side near the after end of the main cabin. Entrance for crew is in flight station on the right side. Additional cargo space is provided beneath the floor.

The Tail

One of the considerations in the design of the triple tail is to keep the overall height at a minimum. The static height of the Constellation is eighteen feet eight inches, as compared with twenty feet nine inches for the 307-B and twenty-seven feet ten inches for the DC-4. A low airplane fits more easily into a hangar. There are other certain aerodynamic features which prompted Lockheed, famous for its twin-tailed aircraft, to add a third fin. These are of great importance in the present design.

For instance, particular attention has been paid to the possibility of failure of engines during takeoff or cruising flight. The arrangement of the Constellation tail surface gives a maximum amount of control and safety for a given pilot effort in the emergency conditions of engine failure.

FOUR WRIGHT engines of the 2,000-horse series are cooled by a new cowl with no more drag than 800-horse engines formerly caused.

The arrangement of the vertical surfaces also tends to increase the effectiveness of the horizontal tail surface which is the major control surface of any airplane. The outboard vertical surfaces eliminate the tendency of air to spill off the end of the horizontal surface, and thereby increase the effectiveness of the horizontal plane. The air, by these means, is harnessed, controlled and made to do the work that is required of it when the elevator is deflected.

The Hydraulic Mock-Up

The hydraulic mock-up duplicates the entire functional mechanism of the Constellation. Every item of the flight control auxiliary equipment such as cabin supercharging, landing gear, flap mechanism, etc., has all been duplicated exactly, in life size, and operated under simulated flight conditions through thousands of cycles in order to establish their merit before actually flying in the airplane.

This method of testing enabled the engineers to run complete checks on such items as hydraulic pumps, valves, and fittings under actual service conditions without endangering the flight test airplane or personnel.

It is interesting to note that many design improvements have been made as a result of these tests on equipment that is normally purchased by Lockheed. Without the use of the complicated hydraulic mock-up tests on purchased equipment, their weaknesses would normally not be discovered until actually installed in the flying airplane. Prudence dictated that a complete functional mock-up should be built at the beginning of the project. The expense has been completely justified, as it is now known that some aircraft manufacturers have had considerable difficulty with their power boost setups and in several instances have nearly lost the flight test airplane as a result.

Research workers also contributed much to the development of the cabin supercharger installation and all of the controls necessary to its operation. This group has enabled the engineers to test all the flight controls of the airplane at extreme temperatures ranging down to minus seventy degrees Fahrenheit. It also played a large part in the structural tests necessary for the choosing of the types of structure for different parts of the airplane, and contributed so much to the knowledge of spotwelding that the exterior surface of the Constellation fuselage is approximately 75 per cent spotwelded, as well as 10 per cent of the wing, including some of the rib structure.

The Cabin Supercharger

Lockheed undertook the design and development of a special supercharger for the pressurized cabin. There are two separate superchargers, either of which will maintain correct air density.

The control system of the cabin supercharger is designed to give a comfortable atmosphere inside the cabin at all altitudes and includes the use of an air cooling system for hot days and an air heating system for cool days, as well as an air purifying system to eliminate cabin smoke, etc. The control system is designed so that with rapid ascent or descent of the airplane, the passengers in the cabin are unaware of the rapid change in pressure on the outside of the airplane.

This method of control will eliminate difficulties presently experienced by passengers, particularly on "sleeper" airplanes, where terrific ear-aches are likely to be developed when descending during the night to some airport and not awakening until landing. These persons who are normally affected by high altitude flight will no longer be conscious of the altitude and will be as comfortable at 25,000 feet as they are normally at low altitude.

(Continued on page 49)

TRIM ON THIS LINE

pilots, or other personnel of the membership of CAP, on the part of any organization or individual, will be referred to National Headquarters. All Wing, Group and Squadron Commanders are instructed herewith to regard all such information as confidential, and will not release such information except upon official approval of National Headquarters.

INFORMATION AND PROCEDURE ON CAP COMPULSORY INSURANCE (GM 61)

NOTE: The statements contained in the following memorandum are merely a summary of the terms and provisions of special Civil Air Patrol Insurance policies. Such statements are not intended to cover in detail the exact terms and provisions of such policies. For exact details reference should be made to the policies themselves, copies of which will be furnished upon request from Headquarters.

Section 1. General information pertaining to aircraft, accident and liability insurance.

1. All three types of insurance under the CAP policies are compulsory on all aircraft, flying personnel, and passengers (other than member of the armed forces) taking part in all **paid** CAP operations which are performed at the request of, and with funds furnished by, any federal or state government of the United States or agency, unit, or department thereof, or any war industry. Such insurance must be obtained regardless of what other insurance may be in effect and no plane or personnel or passengers shall take off until complete arrangements have been made as provided herein.

2. (a) Such insurance coverage is automatically available when proper procedure is followed if such CAP operations are performed at the request of, and **are paid for** by, any federal or state government of the United States, or agency, unit or department thereof or the American Red Cross.

(b) Such insurance coverage is not automatically available for paid operations performed for war industries. To obtain the required coverage in such operations, special arrangements must be made with the insurance underwriters through communication with CAP National Headquarters.

(c) For CAP operations which are **not paid** operations there is no insurance coverage available under the CAP policies.

3. Such compulsory insurance coverage is secured by following the procedure set forth in Section 2 of this memorandum. Applications shall be filled out **prior to the first flight of the aircraft, flying personnel, or passenger**, except as indicated in the following paragraph.

4. Such coverage shall attach automatically upon the execution of the application forms, providing such forms are forwarded immediately as prescribed in Section 2 hereof. At Coastal Patrol and Frontier Liaison Patrol Bases, such coverage shall attach automatically from the time flight commences under orders from a CAP officer having jurisdiction directing that the aircraft and flying personnel report for duty at the Base, providing the aircraft owner or his agent and the flying personnel upon their arrival at the Base properly complete such insurance application(s) prior to the first flight after such arrival.

FOLD ALONG THIS LINE

Subject: Discharge of Members. (G.M. No. 33)

1. All CAP units should secure the discharge of members who are wilfully inactive in the Patrol or whose conduct makes their continued membership undesirable.

2. The service record and identification card of each discharged member should be returned through CAP channels to National Headquarters.

3. Members in the armed services or on aviation duties such as ferrying or flight instruction outside the Patrol may retain their identification cards, but headquarters should receive their service records with the notation that they are not available for Patrol duty.

4. Wing Commanders may approve discharges as follows:

a. Honorable Discharge with Commendation—For members who have been proficient but who can no longer carry out their CAP duties because of ill health or wartime duties outside the Patrol. Discharge should be optional in such cases especially if there is a prospect of the member returning to duty or rendering intermittent service, but members so discharged are eligible for immediate reinstatement. Headquarters wants to confine its files insofar as possible to those currently available for duty.

b. Honorable Discharge—For those who lack qualifications for work in the Patrol and for whom there is no likely place in nearby units; also for those who are inactive through lack of interest. In such cases, return of identification cards should be sought in a friendly manner, leaving the door open to possible later service.

c. Discharge—For infraction of CAP rules not serious enough to warrant revocation of license.

d. Dishonorable Discharge—For infraction so serious as to warrant recommendation for permanent revocation of pilot, mechanic, and radio licenses.

5. The Wing Commander should furnish each discharged member with a signed statement as follows: "This will certify that (insert member's name and CAP serial number) has been (honorably discharged with commendation, honorably discharged, discharged, or dishonorably discharged) from membership and duties in the Civil Air Patrol. (Signature), Wing Commander, (Wing No. and date)." Send copy to National Headquarters.

6. Discharge of a member of the Civil Air Patrol may be effected on approval of the Wing Commander on signed resignation and surrender of identification card. In case of dishonorable discharge, the resignation may be accepted only if accompanied by a notarized statement by the member, acknowledging specific charge as the reason for discharge.

7. In cases where a member does not choose to resign, his discharge may be effected by action of special Boards. Resignation should be suggested under the most lenient terms possible under the circumstances, but there must be no pressure to demand resignations or to abrogate the right of a member to a full, fair and open hearing.

8. For the conduct of such hearings, the Group Board shall be composed of the Group Commander and his Group Staff. In states where there are no Group

2. Authorized Civil Air Patrol shoulder insignia must be sewed, **not pinned** on uniforms.

Subject: Rank and Grade Designated for Civil Air Patrol Coastal Patrols (G. M. No. 50)

1. When any member of the Civil Air Patrol goes on duty with a Civil Coastal Patrol, his duty assignment will determine his appropriate rank and grade in accordance with the table set forth herein, while assigned to such duty, irrespective of the member's status prior to accepting such active duty. Upon completion of the member's tour of active duty, said member's rank and grade will revert to the original status as before such duty tour.

a. Commanding Officer	Captain
b. Operations Officer	1st Lieut.
c. Engineering Officer	1st Lieut.
d. Intelligence Officer	1st Lieut.
e. Pilots	1st Lieut.
f. Observers (Pilot Observers)	2nd Lieut.
g. Observers (Non-pilot)	Flight Officer
h. Asst. Operations Officer	2nd Lieut.
i. Asst. Engineering Officer	2nd Lieut.
j. Asst. Intelligence Officer	2nd Lieut.
k. Airdrome Officer	2nd Lieut.
l. Radio Operator	1 Tech. Sgt., Balance Staff Sgts.
m. Mechanic A & E	Master Sgt.
n. Mechanics (uncertified)	Staff Sgts. and Corporals
o. Radio Mechanic	Master Sgts. and Tech. Sgt.
p. Administration Section Head	Master Sgt.
q. Plotting Board Operators	Sgts.
r. Clerk Typists	Corporals
s. Apprentice Mechanics	Corporals
t. Servicemen	Privates 1st
u. Guards	3 Sgts., 3 Corporals, 10 Privates

2. For administrative purposes the Patrol Commander may appoint one mechanic as Master Sgt. when in charge of or supervising work of other mechanics. Guards, when organized as shifts and as may be necessary for administrative or command purposes, may be organized with three sergeants and three corporals. When State Defense Force personnel are employed as guards, they may wear state uniforms instead of CAP uniforms.

MEMBERSHIP

General: Both men and women are eligible for enlistment. Only American citizens, native-born or naturalized at least ten years from friendly countries, may join. Fingerprints of all are checked by FBI. A limited number without prior aviation experience may be admitted where there are vacancies in local Squadrons from which application blanks and fingerprint cards may be obtained by eligibles. Minimum age for flying duties is 18 and ground duties 16.

The CAP uniform consists of regulation Army garments with special CAP insignia, red braid, and red shoulder loops. CAP is the only civilian organization permitted to wear the U. S. on its emblem which is a red 3-bladed propeller in a white triangle on a blue disc. Officers are appointed as Majors, Captains, and Lieutenants in CAP and wear Army rank insignia. CAP Flight Officers, Sergeants, and Corporals also are appointed.

As a young people's auxiliary, the CAP Cadets are organizing a limited number of boys and girls in the last two years of senior high school. Each CAP Squadron may form a CAPC Squadron and each CAP member may sponsor a Cadet recruit. This organization is explained in the following pages under the title of MEMBERSHIP (General Memoranda No. 58, Civil Air Patrol Cadets).

Subject: Application Information (G. M. No. 6)

Wing Commanders will instruct all ranks that all information contained in application blanks is confidential and must not be given out to anyone except officers of the Army, Navy or Civil Air Partol.

Subject: Citizenship Requirements for Civil Air Patrol (G. M. No. 13)

In order to qualify for membership in the Civil Air Patrol, an applicant must come under one of the following categories:

1. Any natural born United States Citizen.

2. Anyone born in any country which is not an enemy, provided he has been a naturalized U. S. citizen for ten years.

These citizenship requirements apply to all Civil Air Patrol personnel as well as to members.

Subject: Enlistment Procedure (G. M. No. 28)

1. Recruitment of new members must be held insofar as possible to pilots, student pilots, radio operators, radio mechanics, aircraft mechanics, apprentice mechanics, parachute riggers, ground service men and others of actual aviation skill.

2. As in the past, enlistment forms sent directly to National Headquarters by such applicants will be cleared with FBI. Service records will be returned to Wing Commanders for transmittal to local units so that applicants can be interviewed locally and issued their membership cards if they appear desirable members.

3. Applications from **non-flyers other than the above categories** will **not** be approved by National Headquarters unless **endorsed** on the back by **Wing, Group or Squadron Commander.** Such application without endorsement will be returned to the applicant with the advice that he should apply through his nearest CAP unit.

4. It is preferable that applicants for approved-type personnel likewise be endorsed by Wing, Group or Squadron Commander. Applications for people **not** needed locally should **not** be sent to Washington as it is a waste of Government time and facilities to process their papers.

5. Applications bearing endorsement will be returned to the endorsers via CAP channels on Washington clearance.

6. Local CAP units should make sure that all blanks are properly filled in, the required pictures furnished, and fingerprints properly made before sending applications to Washington. Incomplete applications require special correspondence and waste Government time.

7. The above instructions do not prevent local units from accepting non-flyers they really need. But Washington Headquarters must be relieved of the heavy burden of miscellaneous applications from people of no apparent qualification for duty with the Patrol. Their patriotic desire to be of service is appreciated, but as an aviation organization, the Patrol must hold its membership strictly to those who can make some definite contribution to aviation missions.

Subject: Merit Awards (G. M. No. 31)

1. In order that outstanding services of CAP Members may be duly recognized, Wing Commanders are authorized to send to National Headquarters their recommendations for:

a. Distinguished Service Citations—For highly exceptional performance of specific missions, or acts of heroism, under unusually difficult or hazardous conditions.

b. Merit Citations—For initiative and performance of unusual merit on specific missions.

c. Commendation—For exceptional performance contributory to the carrying out of missions of unusual merit.

2. Such recommendations should state the full name, CAP serial number, and CAP Title if any, of each member recommended for citation, together with a highly condensed account of the circumstances. Supplemental papers may be filed in justification. Following is an outline form:

Recommendation for Merit Citations

1. John J. Jones (1-1-254) Commander, Squadron 112-1, Blanksville, Me., for prompt mobilization of his Squadron to fly over a forest fire near Smithville; for piloting his plane with a State Fire Warden as observer over the area under difficult weather and visibility conditions with the result that the fire, which was of incendiary origin, was brought under control.

2. George B. Smith (1-1-323) Pilot Officer, Squadron 112-1, Blanksville, Me., for piloting a plane over a forest fire near Smithville and reporting a family trapped by the flames with the result that all were saved.

3. William B. Green (1-1-280) Senior Observer, Squadron 112-1, Blanksville, Me., for flying as observer in a plane piloted by George B. Smith over a forest fire . . . etc.

4. Wing Commanders may receive recommendations from their Group and Squadron Commanders for transmittal to National Headquarters. Please note that citations must be limited to really unusual cases in order that they will have significance.

FOLD ALONG THIS LINE

sary CAP uniform clothing for the type of work to which they are assigned.

b. They will make sure they have sufficient such clothing for the time they are to be on duty away from their homes.

c. They will also provide themselves with any equipment they consider necessary to their safety or comfort while on duty.

d. Requests for Army issue clothing or equipment cannot be granted, so to avoid embarrassment they should not make the request.

e. The Army has no means of supplying them with such items as flying suits, helmets, parachutes, etc., as such can only be drawn from Army stores by Army personnel.

f. They must make provision to pay for food, and housing for themselves, and gas, oil, and maintenance for their aircraft until their vouchers covering these expenses are paid. As a rule, vouchers are paid within two weeks of their being submitted, and they are submitted only on the 15th and last day of each month. They should, therefore, have sufficient funds to cover above expenses for one month from date of reporting.

Subject: Active Duty Emblems (G. M. No. 68)

1. The following emblems for active duty have been designed by the Office of the Quartermaster General, which may be worn by personnel who have served or are serving on any of the following active duty missions:

a. Coastal Patrol

b. Flight Surgeon (Coastal Patrol only)

c. Courier Service (paid missions only for the Armed Forces or war industries)

d. Southern Liaison Patrols

e. Forest Fire Patrol

2. The above emblems are replacing the "V" insignia that was formerly worn on the left forearm. These emblems are to be worn on the left sleeve 2½" from the top of the cuff on shirts, and 2½" above braid on sleeve of officers' blouse. The above emblems consist of a black satin square, 1½" by 1¾" with design embroidered in gold-colored thread.

3. These emblems can be secured from the Warner Woven Label Company, Inc., 200 Fifth Avenue, New York City, for 6c each. Orders should be in the amount of $2.00 or more, check or money order to accompany same.

4. A gold-colored thread service stripe may also be secured from the same source for 2½c each. It may be worn by those having served six months or more, one stripe for each six months' activity duty. These stripes are to be worn ¼ of an inch below the emblem.

Subject: Identification Cards and Insignia (G. M. No. 35)

1. All members flying on missions of any kind must carry their identification cards with them at all times.

GENERAL MEMORANDA

NOTE: General Memoranda are released from time to time by the several Army Air Forces officers assigned to CAP National Headquarters. These memoranda augment the Training and Operations Directives in that they provide a vehicle for keeping all members informed of changes in procedures, establishment of new procedures and the clarification of previous directives. All Civil Air Patrol Members should keep themselves currently posted by a thorough understanding of General Memoranda.

ACTIVE DUTY ASSIGNMENTS

Subject: Coastal Patrol

Members while in their local units continue their regular occupations and devote their spare time to the Patrol. But thousands who have been able to volunteer thirty days or more of continuous service have been detached from their Squadrons for assignment to active-duty missions which CAP performs for the Army.

Early in the year, when the Axis submarines began to take a heavy toll of shipping on the vital supply routes along our coast, CAP organized a series of Coastal Patrols at points designated by the Army. According to Maj. Gen. Follett Bradley, these "Flying Minute Men" brought their own planes, repair tools, radios, and other equipment to fly on watch over the coastal waters.

Subs spotted by CAP observers have been sunk, General Bradley has revealed. Others about to attack merchant vessels have crash-dived at the approach of CAP planes. Vessels in distress have been reported and hundreds of survivors of torpedoing have been rescued when their position was radioed to shore. The Coastal Patrol bases, under the command of CAP National Headquarters, have their own CAP officers. Many members have volunteered for the duration in this work.

Subject: Inland Activities

Extensive inland missions also are being flown for the Army to help release military planes and pilots for combat duty. While planes upwards of ninety horsepower are required for coastal patrol, the lighter aircraft, of which thousands are available for CAP service, are used on other assignments.

Courier service totaling thousands of miles a day on regular routes and schedules is being flown to carry officers, dispatches, and rush shipments between Army posts. Other work includes towing aerial gunnery targets, tracking flights for guns and searchlights, aerial reconnaissance and inspection, simulated air support for ground troops in training and searches for lost aircraft.

In addition, active missions are performed for Federal and State agencies. For the U. S. Forest Service, area patrol and observation flights over fires have been conducted to conserve timber resources in a number of States. Federal officials have been carried on rush trips. For war production plants, courier services have been organized in many areas to carry key executives and urgent shipments such as machine parts. In some cases, the stoppage of assembly lines has been prevented by this aerial pony express.

Members on active duty receive a moderate per diem to cover personal expenses, including cost of their uniforms and a good deal of their equipment. A moderate rental, varying with horsepower, is paid for planes per hour of flight.

Subject: Volunteer Missions

While not on active duty, members serve without compensation, paying for the operation of their own or rented planes. The only Federal funds spent for this volunteer system are for National Headquarters expenses and limited aid to each Wing office.

All practice flights are on a volunteer basis and often serve purposes beyond that of training. Mock air raids to put the Civilian Defense workers on the alert, blackout observations, and tests of the air-raid warning network are among the jobs done in co-operation with Civilian Defense authorities. Intensive aerial searches have been made for salvage metal piles. In recruiting and War Bond drives, CAP planes drop handbills and stage maneuvers to draw crowds.

In local disasters such as floods and tornados, the Squadrons turn out for reconnaissance and rescue, guard duty, and the flying of medical supplies, demonstrating the alertness with which they would meet a war emergency. Most of the aerial units of the State Guards have been discontinued and merged with CAP because of the greater flexibility of the national organization in operating regardless of State lines. Thus CAP performs the function of an aerial homeguard, co-operating closely with ground units in each State.

Subject: Application for Active Duty Service (G.M. No. 32)

1. Application blanks are available whereby members may volunteer for one month, two months, or three months of active duty service per year. This does not preclude longer service. Members who wish to serve more than three months or for the duration should so state. A short-term volunteer can pledge for a longer term at any time by executing a new oath.

2. Each volunteer should make out his application in duplicate, have one of the copies notarized, and file both with his Squadron Commander who should fill out the part of the two blanks requiring his signature and send both directly to the Wing Commander. A Squadron Commander who volunteers or a member of a Group Staff should file with the Group Commander, and a member of the Wing Staff with the Wing Commander.

3. The Wing Commander should at once sign the notarized form requiring his signature, send it immediately to National Headquarters, and keep the duplicate for his files.

4. Each Wing Commander should set up a special file of duplicate applications, classified according to individual abilities for service as pilots, observers, mechanics, etc. In the larger Wings, card file systems may be necessary to keep track of members who are qualified in more than one skill.

5. The Wing Commander should develop a priorities list of volunteers in each category so that when a call comes for, say, five pilots, he can pick from those at the top of the list. Members next in order will know that they may be called at any time and should be kept advised as to their place on the list.

6. Preference should be given to those who volunteer for the longer terms

Continuation of a series which started in the September, 1942 issue.

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of service. Other factors to be considered in determining priorities include the experience of individuals, the airplanes and equipment they can bring, their record of proficiency in the Patrol, and their preference as to time, place, and nature of service.

Subject: Preparation for Assignments of CAP Personnel and Aircraft to Military Courier and Similar Services, for and with the Armed Forces.

1. Beginning February 1, 1943, and on the first day of each month thereafter, Wing Commanders are requested to submit to National Headquarters, figures showing the number of pilots and aircraft under 90 H. P. in their Command, available for duty in the subject Service.

2. The figures submitted regarding pilots will divide such pilots into groups, as follows:

a. Those available for duration

b. Those available for a period of two months

c. Those available for two or four weeks

The above figures will include those pilots currently on duty in the subject Services, and the number of such pilots currently on duty will be indicated. It is also requested that the above report show the number of aircraft under 90 H. P. owned by, or available to, the above pilots. Only such aircraft as are ready for service, and those which can be made ready on short notice, will be included. Aircraft which are currently being used in the subject Services will be included in these figures, and the number of such aircraft currently being used will be indicated.

3. It is considered essential that the above information be submitted as indicated above, owing to the rapid extension of the subject Services already activated, and the indications that many new activities are presently under consideration. The time allowed in which to start a new CAP Service after it is approved, is generally based on the assumption that personnel and aircraft are immediately available and ready for duty.

4. For pilots who wish to be the first considered for assignments to the subject Services, REQUESTS FOR ASSIGNMENT, OCD Form No. 648, will be completed and submitted to this Headquarters, simultaneously with the pilot's application for CAP Accident Insurance, and Aircraft Insurance when an aircraft is to be supplied. Leave blank "Time effective" on the request form. This date will be inserted on the copy of the form retained in your Headquarters, when a definite assignment is approved by National Headquarters.

Subject: Military Missions by Civil Air Patrol Pilots, Clothing and Equipment (G. M. No. 63)

1. All pilots assigned to service on permanent or semi-permanent missions for the Armed Forces will be instructed as follows:

a. Before reporting for duty, they will provide themselves with the neces-

FOLD ALONG THIS LINE

E. Control Surfaces

1. Check control surface hinges, pins, horns and tabs _____
2. Check stabilizer adjustment and assembly mechanism _____
3. Check tail wheel assembly for condition and lubrication _____

F. Fuselage

1. Inspect covering for damage and distortion _____
2. Inspect control column assembly and accessible parts of control system for freedom of movement and security of attachments _____
3. Check fire extinguisher and first aid kit _____
4. Check stabilizer for freedom of movement _____
5. Check proper operation of quick-release mechanisms of doors _____
6. Check proper operation of lighting system _____
7. Inspect safety-belts for security _____
8. Clean all windows _____

G. Radio

1. Inspect antenna and connections _____
2. Inspect battery and connections _____

H. Signal Lights

1. Check proper operation of signal lights _____
2. Check spare light globes _____

I. Armament

1. Inspect ordnance mounts, racks and release mechanisms _____
2. Inspect ordnance for proper installation and safety keys _____

J. Emergency Equipment

1. Check flotation gear _____
2. List and check other emergency equipment carried _____

K. Inspection completed at _____ (24 hr. clock) _____

Inspected by _____

Title _____

Approved for flight by _____

Title _____

networks by holding the circuits open. Furthermore, TWX tolls are charged on the basis of the number of minutes the circuits are in use or held open.

d. Inasmuch as stations called will announce by their unit designation and location as prescribed in paragraph 2a above, teletype communications between CAP units and to National Headquarters will carry no inside address. Messages to National Headquarters will not be addressed to any particular individual, as all such messages will be routed to the proper office for attention.

e. If more than one message is to be transmitted on one call, each will bear the heading prescribed in paragraph 2b above, followed by the usual acknowledgment.

f. In a two-way conversation, in order to avoid breaking in on a statement before its completion (unless some flagrant error has been noticed), operators will not start typing before the phrase "GA" appears.

4. Commanders of all CAP units are responsible that the instructions set forth in this directive are strictly observed.

5. All units having TWX teletype service will advise National Headquarters of their call signs and will keep this Headquarters currently informed of any changes.

O. D. NO. 32. CAP SOUTHERN FRONTIER LIAISON PATROL

The contents of this directive are restricted to Southern Frontier Liaison Patrol.

O. D. NO. 33. MAINTENANCE OF PHYSICAL CONDITION OF COASTAL PATROL AND LIAISON PATROL FLIGHT PERSONNEL

1. The maintenance by all flight personnel on duty with CAP Coastal Patrol and Liaison Patrol units of physical condition requisite for this type of service is extremely important. Periodic breaks from routine work which are spent in exercise or relaxation are essential to the maintenance of the high standard of physical fitness necessary for the efficient performance of assigned flying missions. It is directed, therefore, that in addition to the one day rest per week required of all Coastal Patrol and Liaison Patrol personnel (See paragraph 2 b, Operations Directive No. 13-C, August 26, 1942, and paragraph 25 b, Operations Directive No. 32, November 10, 1942, both issued by this Headquarters), all flight personnel on duty with Coastal Patrol and Liaison Patrol units be required to take two days off per month as part of their official assignment. Said two days shall be taken in conjunction with a weekly rest day in order to provide a period of seventy-two (72) hours continuous absence from duty.

2. Said rest periods will be scheduled in such manner as to cause no interruption of tactical operations and will not be cumulative.

O. D. NO. 34. CRASH PROCEDURE FOR CAP COASTAL PATROLS AND LIAISON PATROLS

1. The Commanding Officer of each CAP Coastal Patrol and Liaison Patrol is hereby charged with the responsibility for the organization, equipment and training of a Crash Crew for the unit under his command, unless adequate crash facilities are already available at the airport on which the unit is based.

2. This work shall be handled in accordance with the procedure set forth in Training Directive No. 8, Crash Procedure, this Headquarters, March 20, 1942, and shall be accomplished as expeditiously as circumstances permit. Such equipment and supplies as may not be on hand or available for use from other sources shall be procured from available base funds.

3. In addition to the equipment listed in Training Directive No. 8, there shall be provided a pair of strong, industrial-type gloves for each member of the Crash Crew.

O. D. NO. 35. DAILY LINE INSPECTION OF AIRCRAFT CAP OPERATING BASES AND STATIONS

1. All aircraft on duty at CAP Operating Bases and Stations shall be given a thorough line inspection at least once each day on which said aircraft are in operation and, if practicable, before each flight mission. Said inspection shall cover all applicable items listed on the attached form "Report of Daily Line Inspection of Aircraft," which form shall be used in recording report of each such inspection.

2. Said reports shall be made in single copy and shall be retained in the Engineering Files of the Base or Station.

3. As soon as the printing of this form can be completed, copies will be supplied all Bases and Stations in pads of 100 copies each. In the meantime, each of said units will typewrite the forms as needed.

CIVIL AIR PATROL

.....No.....
(Name of Patrol or Station)

(Location) .....

(Date) .....

REPORT OF DAILY LINE INSPECTION OF AIRCRAFT

(NOTE: Complete line inspection as covered by this report shall be made of all aircraft in operation at the Base or Station at least once each day and, if practicable, before each flight mission. Check stisfactory items and give information on all irregularities.)

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General Data

Make of aircraft.....Model.....NC No. .....

Make of engine .....Model.....H. P. .....

Owner .....Time on aircraft since 25-hour check .....; Since 100-hour check.....; Since major overhaul.....

Time on engine since top overhaul.....; Since major overhaul.....

Line Inspection

A. Propeller

1. Inspect blades for cracks, nicks and pits.....
2. Inspect hub and attachments carefully.....
3. Check propeller for track .....

B. Engine

1. Inspect engine cowling for cracks and security.....
2. Inspect exhaust stack and ring for cracks and security.....
3. Check sparkplug terminals for tightness and cleanliness.....
4. Inspect accessible ignition wiring and harness for security.....
5. Check fuel and oil systems for leaks, vents, fit of caps.....
6. Check fuel and oil supply (do not rely on gauges).....
7. Check all bolts and nuts on engine and mount.....
8. Check with propeller for compression on each cylinder.....
9. Check heater muffs .....

C. Landing Gear

1. Inspect tires for defects and proper inflation.....
2. Inspect wheels for cracks and distortion, hub caps for security .....
3. Inspect strut retaining bolts and fittings for security.....
4. Inspect brace wires for tension and security.....

D. Wings

1. Inspect ribs for buckling, end bows and covering.....
2. Inspect attachments, fittings for security.....
3. Check struts and flying wires for security of terminal connections .....
4. Check aileron hinges, pins, horns and tabs.....
5. Inspect accessible control cable, tubes and pulleys for security .....

FOLD ALONG THIS LINE

O. D. NO. 31. TELETYPE PROCEDURE

1. In order to expedite handling of urgent matters pertaining to CAP tactical operations, there has recently been installed at National Headquarters, a TWX teletype machine. (Call Sign—WA 302).

2. The following specific procedure will pertain in the transmission of teletype messages:

a. When receiving a call, the operator will announce with the unit designation and location, the operator's initials, followed by GA, as: "CCP 12, Brnsvl. Tex., BM, GA".

b. The unit calling will announce its designation and location followed by the date, time and operator's initials, and immediately proceed with the message, as: Natl. Hq., CAP, Washn., D.C., 10-5-42 1405Q, HLS Reurlet 10-3..... JOHNSON".

c. (1) If an immediate reply is requested, the caller will type, "GA".
(2) If no reply is necessary, the caller will type, "END ACK".

d. (1) If the message received required no reply, the operator will acknowledge by typing, "RCD" followed by the unit designation and the time of receipt, as: "RCD CCP ;2 ;2;OQ".
(2) If the message requires an **immediate** reply or the receiving operator is ready to send a message or ask a question, the incoming call will be acknowledged first, followed by a request to hold the line, as: "RCD CCP 12 MIN".
(3) After an exchange of messages, the operator terminating the exchange will type, "END" followed by the unit designation and "OFF ACK", as follows, "END NATL. HQ. OFF ACK". If the other station has completed its call, the operator will acknowledge by typing "OK" followed by unit designation, "OFF" and time of termination, as follows, "OK CCP 12 OFF 1310Q", whereupon both stations will immediately disconnect.

3. The following general rules will apply in the use of the TWX teletype circuits:

a. TWX teletype circuits will be used only when the situation is of such gravity as to place the use of such circuits in the category of a "military necessity". Careless and indiscriminate use of these circuits impedes the war effort by tying up facilities which already are seriously overloaded by essential military requirements. The TWX Circuits differ from the special leased loop teletype circuits held open for continuous use in that TWX is a general nation-wide communication network.

b. The content of messages will be kept to the minimum consistent with clarity. Abbreviations will be used wherever possible. Trailers on routine matters that could be handled by mail without seriously hindering operations will not be added to TWX messages.

c. Unless an immediate reply can be furnished, circuits will **not** be held open until the requested information can be obtained. It is more expeditious to place another call than to tie up already overloaded communication

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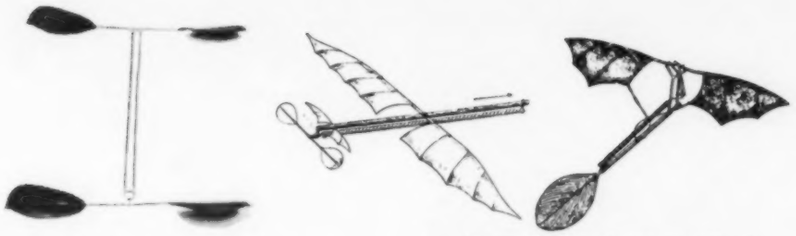


(From Histoire De L'Aeronautique)

SEVENTY YEARS AGO Alphonse Penaud startled France with his work in aerodynamics. Here are some of his famous creations—a helicopter, a rubber-powered planaphore, and a mechanical bird.

PROPHECY

(Continued from page 29)

in infinite varieties of combination, with or without the dynamic wing beat.

Many attempts have been made to use flapping wings in a mechanical flying structure—Penaud himself made a small model which actually achieved flight—but none of these have attained more than a clumsy approximation. For man's purposes, the conventional aileron, rudder and elevator give better results, because the mechanics of natural jointed structures of bones, tendons and a multiplicity of muscles and feathers under instinctive reflex control are difficult of even approximate realization in practical mechanical structures.

Most birds have only relatively flat tail surfaces, controlling longitudinal stability and attitude, and helping to make turns or to control yawing, without the aid of the vertical fin and rudder which must perforce substitute in the conventional airplane.

Stability of the center of pressure on airplane wings can be obtained by several means, foremost being the use of reverse camber near the trailing edge. The most common means of overcoming the retrograde movement of the center of pressure on most wings is the use of horizontal tail surfaces at negative incidence to the down wash of air flowing over the wings, and this in effect is the equivalent of the reverse cambered wing.

The prime need of a rudder to control yawing results from the fact that in the usual range of flight angles, increased lift is accompanied by increased drag, and vice versa. If the lift is unbalanced along the span of the wing, a yawing tendency is created by the difference in drag, and this is particularly true if a turn is initiated by change of lift at the wing tips. Yawing also occurs if a turn is initiated by rudder, but in this case the rudder aids in overcoming most of it.

In a number of instances, both in flight pioneering and in more recent years, an effort has been made to go nature one better and dispense with both the body and the tail as such, by transferring the tail functions to the wing tips. A fair degree of success has been attained in tailless types, or flying wings, with some loss of aerobatic maneuverability.

The earliest demonstrations of the possibilities of artificial flight were gained by the use of relatively crude gliders, and such flights gave the first insight into the nature of the problems of flight. Real progress in the art of flying began when man contrived gliders capable of carrying him, and learned from experience how they behaved under different conditions. Power-driven flight was achieved only after a man, practiced in the art of gliding, dared to trust himself in flight with power instead of gravity as the means of propulsion.

By the toss of a coin it was Orville Wright, rather than his equally competent brother Wilbur, who gained the distinction of being the first to achieve power-driven flight. Together, the Wright brothers had discovered the means — the elevator — to overcome the retrograde movement of the center of pressure on the wings; they achieved control of lateral attitude by warping the wings; they had provided, in the rudder, the means to control direction, and after experimenting with controlled kites and gliders had learned to control adverse yaw by interconnecting the lateral control and the steering control to compensate for yaw. They avoided propeller torque and slipstream effects by using twin pusher propellers rotating in opposite directions, and thus avoided the gyroscopic effects of the propellers.

Their splendid achievement came, however, only after nearly a century of intensive study and experimentation by many pioneers, of whom they were two of the foremost. The first really tangible efforts to present the theory of flight were made early in the last

★ ABILITY

★ PRECISION

★ PRODUCTION

DOLAN AIRCRAFT MANUFACTURING COMPANY

DALLAS, TEXAS

century, and by the latter half of the century men like Penaud were achieving almost unbelievable results.

The following story about Penaud and his patent for a plane which was almost a "flying wing" except for the Penaud tail still used on conventional airplanes, has been pieced together over a number of years by the author. Among the scanty sources of information are the patent application filed by Penaud and his associate and mechanic, Paul Gauchot, on February 16, 1876; the patent itself, issued the same year, April 8; the listing of the patent in the 1877 French "Catalogue des Brevets"; publication of the complete drawings and specifications in "L'Aeronaute" of October, 1877; an article by Octave Chanute in the January, 1894, "American Engineer and Railroad Journal;" proceedings in the U. S. Patent Office in 1912 in connection with a Rex Smith patent; an article on "Pioneers of Aviation" in a 1913 issue of "Aircraft," and an article dated November 17, 1917, in the "Fachzeitung fur Flugtechnik." A certified copy of the patent was obtained for the U. S. War Department in the winter of 1922-23, and the author also has used the longhand notes appearing over the signatures of the inventors on the original drawings.

Alphonse Penaud was born in Paris in 1850. Little is known of his early life, but he was the son of a French admiral and intended to enter the Navy himself. The effects of some implacable disease—it may have been infantile paralysis — which crippled him closed that career, and he turned instead to research and experiment in aviation.

The details of his education have not come to light, but he must have had a thorough schooling in engineering, for his learning along these lines is amply evidenced by his achievements. He was a perfect technician and an able theorist, and to these qualities he added a fine and attractive personality—sweet, modest, with an enlightened spirit and extraordinarily good sense.

In April, 1870, Penaud invented a motor of twisted rubber strands which today is still a popular means of providing power for aviation models. His first application of this motor was to a helicopter, a modified version of which ultimately found its way to the Wright brothers. The care and perfection which marked all his work are found in the helicopters he later had built by the clockmaker Breguet, in which the smaller metallic pieces were made of aluminum, then a rare and costly metal. The propeller blades were gilded to overcome resistance and improve their efficiency.

The following year—1871—Penaud gave, in the gardens of the Tuileries in Paris, the first public demonstration of the flight of a small airplane. Did the people who watched have an inkling of the enormous importance of the thing they saw? For the first time in the world, the man in the street saw power-driven mechanical flight an actuality, not just a dream.

The small airplane which Penaud designed and constructed he called a "planaphore." It was a monoplane with a propeller driven by twisted rubber and was fitted at the rear with a stabilizing surface. The propeller could be arranged to act either as a pusher or as a tractor.

That demonstration was a milestone of capital importance along the way to flight, because it showed the possibility of sustained flight by an airplane. Later Penaud repeated the demonstration before the French Society of Aerial Navigation, of which he was one of the organizers and one of the most assiduous and interesting members.

With his planaphore Penaud was able to study the longitudinal stability of airplanes and to demonstrate the principles of the Penaud tail. *That tail is the one used today* in all but tailless types of planes, and even there it is approximated by the washout in the trailing tips.

To compensate the torque of the propeller he twisted one wing to gain lift, or better — because it avoided the yawing effect of the unsymmetrically twisted wing — loaded the opposite wing with a small weight. Flights of sixty meters were obtained with a planaphore weighing only sixteen grams.

In September, 1871, Penaud constructed a small mechanical bird, a model airplane with flapping wings, using the twisted rubber bands to oscillate the wings. And it would fly—he obtained flights of ten to fifteen meters with his model, and altitudes up to five meters above the point of launching.

In 1872 and 1873 he published the laws of gliding and proposed a method of studying the resistance of the air. Following this he developed the theory of flight with wings. Also in 1873 he indicated the use of the Zoetrope and a succession of instantaneous photographs to study the flight of birds, and it was shortly after this that Marey succeeded with just such a method.

It was at this time that Penaud conceived the interaction of the ground on wings, and the importance of centering the lift, thrust and drag. He also conceived the division of the wing function of birds into sustaining and propelling portions.

By 1875 Penaud had set up definitely three major problems of aerial navigation: resistance of the air, strength of materials, and light engines. He applied himself in particular to the first two and sought to employ the useful effects of airflow, while minimizing its useless effects. In that same year the Academy of Sciences gave him a prize for his theory of flight, and about this time he published the design of an elongated captive balloon.

In pursuit of the problem of materials he studied the properties of tissues, metals and wood, and of their assembly into efficient structures as aircraft parts. He was familiar also with instruments of navigation and piloting, and had a knowledge of marine structures and bridge structures.

Analyzing the patent in the light of this brief sketch of the character, skill and perseverance of Penaud, it will be seen readily that the patent is a resume of all the knowledge that he had acquired, and that it embodied his conception of an airplane that bears a startling resemblance in many aspects to the features found in today's planes.

In describing Penaud's design, italics are used to indicate its features which we are accustomed to think of as developed much more recently than sixty-six years ago.

The drawings which accompanied Patent No. 111574, formally delivered to Messrs. Penaud and Gauchot, No. 14 Rue de Castellane, Paris, by the Minister of Agriculture and Commerce on April 8, 1876, show a *high-wing, twin-tractor monoplane amphibian* airplane with a *retractable* four-wheeled chassis.

The wings are symmetrically disposed, presenting a large sustaining surface, *tapered* in plan form and tapering in thickness at the tips. The rear portion of the wings (shaded in the drawing) is *reverse cambered*, and to its rear margin are appended directly twin *balanced elevators*. The wing, with *through spurs*, rests directly on top of the nacelle, or body, to which it is rigidly attached.

The body has a *streamline* form, in plan and profile, and at the rear a *vertical fin* with a *balanced rudder*. A transmission placed forward gives the pilot *dual control of elevators and rudder*, and a bowsprit projects forward to aid the eye of the pilot as an *attitude indicator*.

(Continued on page 44)

NEW LIFE RAFT FOR 'FORTS'

EDDIE RICKENBACKER and other airmen who have escaped a relentless sea are the inspiration for a new rubber life raft that will save more American lives when planes are forced down into the waves.

The latest equipment is a seven-man raft to be carried by Flying Fortresses. It was designed by the Equipment Laboratory of the Army Air Forces' Materiel Center at Wright Field, where Capt. William Cherry, Rickenbacker's pilot on the ill-fated Pacific flight, has been assigned as consultant.

The raft, worked out in collaboration with United States Rubber Company, rolls into a carrying case three feet long by one and one-half feet in diameter and weighs seventy pounds.

Let's unroll it quickly and toss it overboard from a sinking bomber. The raft is inflated on compressed gas and springs out twelve feet long with a beam of five feet eight inches. It has a blue bottom, so as not to attract sharks, but if one snags it, there is a horizontal bulkhead to keep the raft afloat.

The crew clambers in. They find oars, a sail, and an orange-yellow tarpaulin to keep the sun from blistering them while serving as a bright color to attract passing ships or planes. A fabric sea anchor will keep the nose of the raft headed into the waves to lessen their danger.

Maybe some of the crew are hurt in the splash landing. Well, there's a first aid kit. Other survivors will break out the fishing kit and emergency and signal kits, the latter including a box kite, which can also be used for fishing. In some boats will go even a radio sending set.

These items, together with concentrated rations for thirty days, are secured in a waterproof container fixed on the bottom of the boat. Also the crew finds a bailing bucket, a plastic hand pump, and ten-foot rope lines on either side of the raft to right it in case it capsizes.

The raft is equipped with fabric cross-members that serve as seats so the men don't roll together or have to pile up on each other.

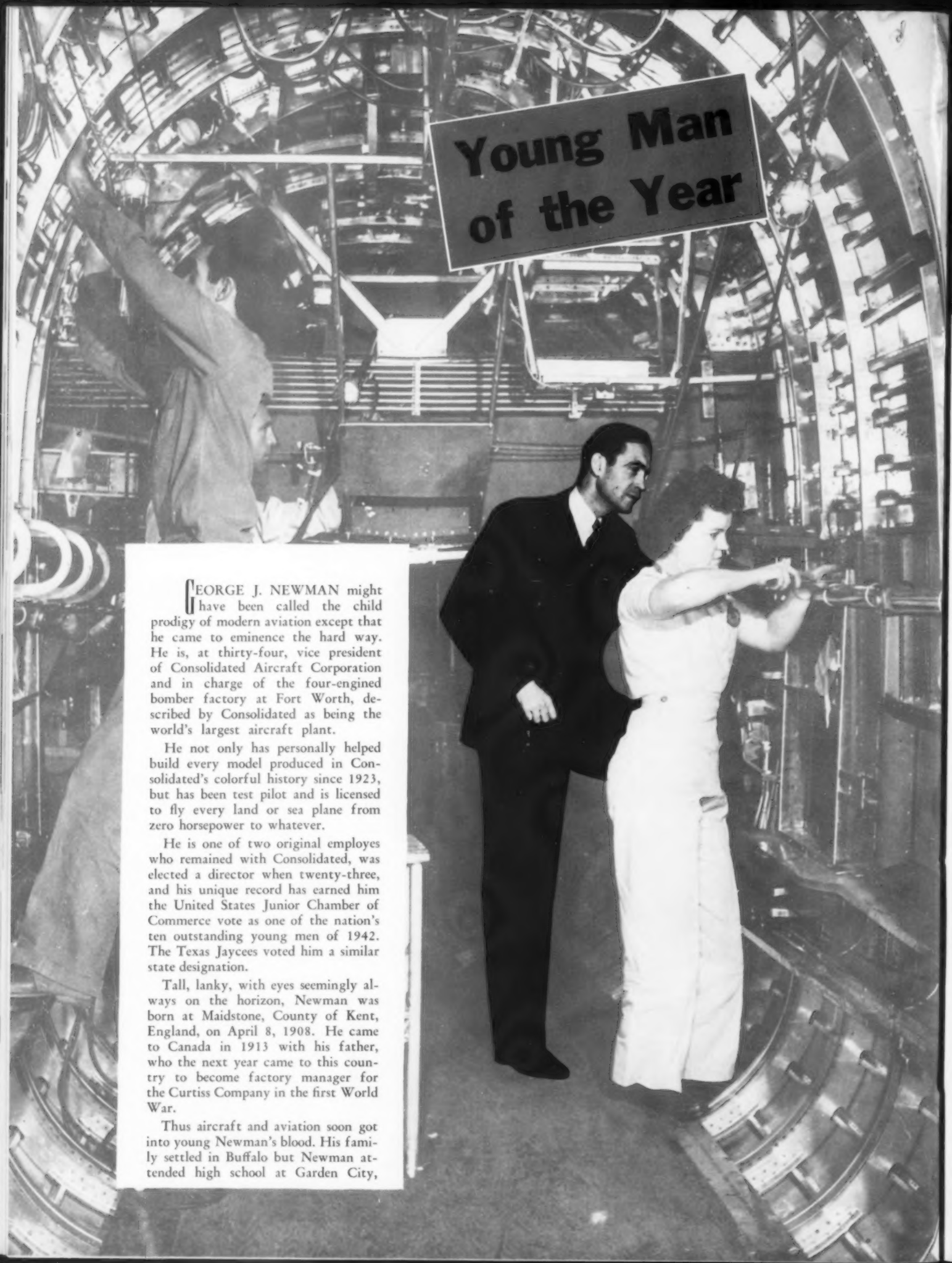
—U. S. Rubber Co. Photos.

SQUARE-RIGGED SAIL enables seven men to navigate with winds in the new "Flying Fortress" raft designed by Wright Field and the U. S. Rubber Co.

MANY ACCESSORIES FOR SURVIVORS include fishing kit, signal kit, tarpaulin, first aid supplies, thirty-day rations, water, radio transmitter, sea anchor, bailing bucket, knife, repair set, whistle, sail, kite for signals and fishing, and other gadgets.

COMFORT FEATURES include this tarpaulin to protect men against sun.

Young Man of the Year



GEORGE J. NEWMAN might have been called the child prodigy of modern aviation except that he came to eminence the hard way. He is, at thirty-four, vice president of Consolidated Aircraft Corporation and in charge of the four-engined bomber factory at Fort Worth, described by Consolidated as being the world's largest aircraft plant.

He not only has personally helped build every model produced in Consolidated's colorful history since 1923, but has been test pilot and is licensed to fly every land or sea plane from zero horsepower to whatever.

He is one of two original employes who remained with Consolidated, was elected a director when twenty-three, and his unique record has earned him the United States Junior Chamber of Commerce vote as one of the nation's ten outstanding young men of 1942. The Texas Jaycees voted him a similar state designation.

Tall, lanky, with eyes seemingly always on the horizon, Newman was born at Maidstone, County of Kent, England, on April 8, 1908. He came to Canada in 1913 with his father, who the next year came to this country to become factory manager for the Curtiss Company in the first World War.

Thus aircraft and aviation soon got into young Newman's blood. His family settled in Buffalo but Newman attended high school at Garden City,

George Newman spends much time with workers in the Fort Worth Bomber Factory. He also tests four-engined B-24's and Cargo Planes and once delivered a Liberator to a Texas air base.

Long Island, where at fifteen he had finished schooling to take a job in the wing department at Gallaudet Aircraft in Rhode Island.

He hadn't been at Gallaudet long before Maj. R. H. Fleet, the general manager, formed a new company and took over. But there wasn't plant space enough when Fleet secured an order for thirty-five Army training planes. Fleet removed the factory to Newman's old home in Buffalo in 1924.

Young Newman worked in one department after another, learning each fundamental of aircraft manufacture. He welded, he was a machinist, he worked in the oil and gas tank departments, he put planes together on the final assembly line.

In July, 1928, he obtained his first pilot's license, after being promoted to superintendent of the important Consolidated commercial business — the Fleet aircraft division.

The new pilot went right into flying boat experience, for in 1928 Consolidated, which specialized in Army and Navy contracts, came out with the mammoth Admiral. It was the largest flying boat ever built, with a wing span of 100 feet. It was succeeded by the Commodore, and Newman found time to become a seasoned sea plane pilot. But making planes was the job he kept his eye on.

Most of Consolidated's business then was in flying boats. Buffalo, however, lacked ice-free waters in winter and the company decided to make a change.

First employee to move was Newman. At twenty-seven, he then was assistant factory superintendent. He was ordered to California in July, 1935, and set out in his personal plane.

His job was to install machinery and equipment in a San Diego plant ahead of the arrival of the rest of the organization. And he had to hire people, too. Apparently that work was as thorough as the rest of his aircraft building, for many of his employees have remained and risen to ranking positions with Consolidated.

In the new plant, Newman continued to fly Consolidated products. For a year he served as assistant chief test pilot, doing much of the preliminary testing of the experimental XB-24, which became, as the Liberator, the fastest four-engined bomber in World War II.

Consolidated received a large order from sorely-pressed Britain as the second World War came around. In February, 1941, Newman took off from San Diego in the first Britain-bound bomber. He shoved that B-24 Liberator across the continent to New York in nine hours and fifty-seven minutes for a record. He took the plane on to Montreal, and apparently planned to take it right on across the Atlantic, but couldn't get governmental permission.

There was plenty of business for him back at San Diego, and he hurried home. Within two months Consolidated had to build its second plant and Newman was assigned the task of turning out parts and subassemblies. He did such a top-flight job in West Coast parts production that on March 3, 1942, he was named vice president in charge of operations at the new Fort Worth plant.

New records follow Newman's progress. The Fort Worth plant turned out its first Liberator bomber in April, 1942, more than 100 days ahead of schedule. It produced the first C-87 Liberator Express cargo counterpart a few months later — thirty days ahead of schedule.

The Fort Worth plant contains several aircraft innovations. It has the longest straight mechanized assembly line in the industry. A recent parts plant building addition makes it probably the largest self-contained aircraft factory in the world.

Its boss is an unassuming young man you wouldn't even notice in a crowd of tall Texans; he has an awful singleness of purpose.

PROPHECY

(Continued from page 40)

The two propellers are located forward of the wings, and adjacent to the sides of the body, with an alternate location indicated in openings within the wing frame.

The wings are formed of *multiple rigid spars* across their span, with fore and aft members, or *cap strips* applied over them. Sharp edged rigid border units form *marginal formers*, and the wings are *double surfaced*, with fabrics, *sheet metal* or *plywood*. To reduce friction and protect the surface from weathering, various "dopes" are proposed.

French patents have their peculiarities, among them "reserving the right" to do thus and so, and Penaud and Gauchot "reserved the right", in forming all rigid parts of their machine, to use metal, wood, or other strong materials in solids, sheets, tubes and sectional forms such as *double T's* and all the forms now used in industry and construction to obtain strength with lightness. Tubes, they suggested, could be formed of rolled plates or *multiple plys*, and fitted with light wood *bulkheads*.

They suggested wings surfaced with metal or plywood incorporated as members of the wing structure, bulkheaded at intervals with upright members—a construction which, with the multiple spars, anticipates the compartmented construction of the *stressed skin* wings.

The wings were *slightly concave* underneath in the forward portion, to act on the air like a marine propeller with increasing pitch; and the design provided also for giving the wings a slight twist, so that the part nearest the body was presented at a greater angle than the outer portion—an arrangement which was, in effect, *wash out*.

Stable equilibrium was to be obtained by reversing the sectional curvature of the rear part of the wing, an arrangement which anticipated the table center of pressure in *reverse camber* wings, and another way of obtaining the well-known stability of the *Penaud tail* used by all conventional airplanes.

The wings were braced by an upper *stay wire* system, with two small masts forming *pylons*, and a lower stay wire system with the lower ends of the stays fastened to the base of the nacelle. At the outer ends, the stays were attached to *reinforced* ribs. Moreover, the inventor provided for eliminating these stay wires in high speed machines, contemplating *cantilever wing* construction. He also suggested joining the two wings in a blunt *dihedral* with the crest down—the *lateral dihedral* with its well-known properties of lateral stability.

The principal members of the body, or nacelle, were four *longerons*, the upper two of which were connected to all the wing spars. At the rear, the longerons supported the hinges of the elevator and the lower hinge of the rudder, and provision was made also for rudder braces, and for strut and shear bracing.

Since the plane was *amphibian*, the nacelle was made watertight, and the *cabin* for passengers was provided with portholes. The passengers had access to the cabin either through *side doors* or through the hatch provided for the pilot's head in the top of the nacelle, and this hatch in turn was equipped with a windshield or a *streamlined cockpit cover*.

To protect the rudder if the plane should tip backward while on the ground, a *tail skid* was provided.

The elevators and the rudder were of similar construction—each had an internal member comprising rudder post or hinge, and marginal members. As in the wings, surfaces would be applied to the framework with or without cap strips. Balance was proposed for the elevators, to permit them to *stream into the wind* when not controlled by the pilot, and the balance was to be achieved by *counterweights* or *springs*. The drawings showed compensated surfaces for the rudder and elevators, and the elevators were interconnected. A single crossbar held by the pilot controlled both rudder and elevators.

The two equal propellers at the front of the wing were placed so that their axes were slightly below the wings, a position important for longitudinal equilibrium because it passed the line of thrust close to the center of resistance and the center of gravity in flight. They were given opposite pitch and turned in opposite directions at equal speeds, preferably turning outwardly above. They could be actuated independently, or by common control, and Penaud even suggested *variable pitch*.

Still more remarkable is Penaud's suggestion of utilizing the variable pitch of the propellers in such a way that by reducing the pitch the propellers could *speed up and store energy for the take-off*, by which method the stored energy becomes available to assist in the take-off when the pitch of the blades is quickly increased to normal. Yet more remarkable is Penaud's disclaimer of invention of this feature, for he says he took the idea from the earlier art of a different type of aircraft, "the helicopter", using lifting screws. Thus was foreshadowed *the jump take-off of the present-day gyroplanes*.

Penaud also recognized the advantage of *using centrifugal force to stiffen the propeller blades against bending due to thrust loads*.

The propellers were to be entirely metallic, preferably steel, formed of radius rods with blades attached. The *helical blades* were to be finished in such a way as to penetrate the air with a minimum of friction.

Each propeller shaft was mounted in bearings in a rigid frame fastened to the forward ribs, and among the various transmissions suggested was *crank shafts* for engines mounted in the wings, where the pilot and mechanic could have direct access to them. Or, Penaud said, the engines could be in the nacelle, with shaft-and-gear or chain-and-sprocket or other transmissions to the propeller shafts. Steam and internal explosion engines were suggested, with others, as usable power plants.

One of the most startling features of Penaud's design was the four-wheeled *retractable* chassis, with *channels* in the nacelle to contain the retracted gear. The forward wheels were *castered* (like the wheels of a chair), *canted* slightly to make them *self-aligning* and give them *free orientation* so that resistance from forward would not cause the plane to nose over in landing.

The wheels in the drawings have *steel rims* on *steel cone disks*, and the landing gear springs consist of rubber strand shock absorbers, or *bungees*. These, Penaud suggested, could be replaced by *airsprings*.

A *tripping release* was provided for the projection of the wheels, and retraction was achieved by cords or chains passing over pulleys, aided by the weight of the gears and by special springs. When the wheels were projected and ready for use, a bolt locked them in position to withstand the landing shock.

For land take-offs, the conventional taxiing was indicated, or an arrangement which was actually a catapult launching. On the water, the plane could glide on the bottom surface of the nacelle, or on inclined metal surfaces rigidly supported under the nacelle. These latter, obviously, are *hydrovanes*.

Of mechanical devices to aid the pilot, Penaud proposed a *longitudinal water-level*, or a *manometer* actuated by a water column; a *compass*, a me-

(Continued on page 49)

"There Goes 'Tex' Again"

Great fellow, that "Tex" . . . flies like he'd been born with wings . . . yet eight months ago he was working derrick on a Gulf Coast rig . . . must've always had a yen to get up where he could see what was going on . . . and man does he get up there now . . . 30,000 as easy as hedge-hopping . . . engine just seems to purr with his hands on the controls . . . guess those two thousand horses know there's a Texan in the saddle.

Texans are in the saddle wherever there's action these days. In the air, on the ground, and on the sea there are few fighting outfits that don't have a "Tex." In peacetime "Tex" is a good civilian—in war he makes a good soldier.

More than 2,000 Texans have gone from the employ of the Humble Oil & Refining Company into the armed forces. Each day sees that number grow and in support of those who serve in uniform are 13,000 men and women back in Texas who have dedicated their entire energy to all-out war effort.

These 13,000 civilian soldiers of Humble are turning out millions of gallons of 100-octane aviation gasoline for fighting planes; many other millions of gallons of 91-octane fuel for training planes; special stratosphere greases and instrument oils for high-altitude flight; tremendous quantities of Toluol for high-explosive bombs; asphalt for runways; rust preventives for aircraft engines; and many other special petroleum products for the great American air forces. They are backing their "Tex" with their brains, their brawn and their bonds. They are in this fight to win.

★ **Today Humble-Esso Aviation Products serve the vital demands of war; tomorrow they will serve equally well the needs of peace.**

HUMBLE OIL & REFINING COMPANY

HUMBLE

13,000 Texans United in the War Effort

SHAKE-UP SCHEDULE

For War Training Service

Drastic changes in the War Training Service are under way. We'll have only half as many contractors, but they'll be doing twice the work. The new president of the National Aviation Training Association is hopeful.

By LESLIE H. BOWMAN

President, National Aviation Training Assn.

A FAR-REACHING change is being worked out in CAA's War Training Service (formerly CPT), reshaping this flight-training program to fit in more effectively with the requirements of the nation's military forces. Big increases in trainee quotas are in prospect for all operators retained in WTS. Minimum units will be approximately 100 to 120 students at Army WTS bases, and up to as high as 500, depending on accommodations available.

The new WTS system will begin operating in March, getting under full progress in April. Now numbering something like 550, the flight-training contractors remaining in WTS will total approximately 250 to 260.

Planned by the Military

Becoming bigger operators, the NATA members in the future will be on stronger financial foundation. Thus NATA, although enrolling fewer individuals, will be in better position to strengthen its efforts in behalf of the non-scheduled aviation industry. One important task will be organizing strength to meet the swift and drastic changes certain to befall when victory is won in World War II.

The immediate problem, of course, is to organize all our nation's flight-training resources that are in civilian control, to give the Government the most effective support that we can muster to hasten the winning of the war. This refers also to mechanic and technical training. Thousands — even millions — of mechanics are needed; yet a considerable number of CAA rated A & E schools are not being used in the nation's war effort. Better trained mechanics, fewer air accidents — that follows as sure as the day follows night. We must use all our unused facilities in the field of approved A & E training, or by just the measure to which those resources remain idle, we are impairing the nation's air striking force.

Efficiency was a chief factor in determining to cut down the number of WTS flight-training bases. Army Air Forces wanted larger units in order to make supervision and discipline easier problems to handle.

When the new system is installed, Army and Navy will have separate WTS bases; that is, nowhere will one operator train for both services. Differences of training are necessary, because Navy pilots must be taught to operate off of aircraft carriers. With segregation accomplished in WTS, thereafter the Cadet will begin his instruction under either Army or Navy procedure at the outset, and continue through to completion of his course under one training system.

Formerly two training systems at one WTS field resulted in confusion. The arrangement to differentiate in training procedures was completed at the direction of Army and Navy Air Corps. Military policy also decided the setting up of fewer and larger WTS operations.

Translating these changes into the effect upon NATA membership, our association finds some of its members being eliminated as flight-training contractors. The dominating policy of NATA members, until the Allied Nations are victorious, is to take orders like good soldiers. It is the task of our military chiefs to map out the campaign strategy, while our task is to execute orders. At the same time NATA must not — and did not — cast aside the members who are so unfortunate as to fail to be selected for continuing in the new WTS program.

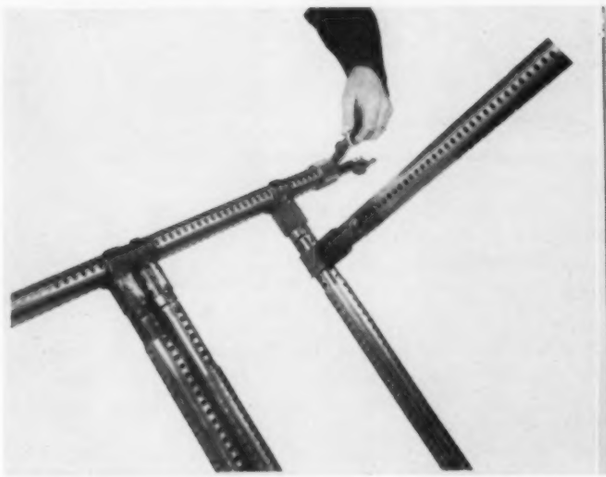
Vast High School Project

What was done for the operator who was eliminated? Several moves in his behalf were fostered by NATA, or received NATA support. Our association helped work out many of the details in Washington for the new WTS procedure. In the first place, the eliminated operator, if he wishes to sell his flying equipment, may dispose of all planes useable in flight-training. The Defense Plant Corporation will buy them, to lease them to CAA, to be sub-leased to WTS contractors. Or the eliminated operator may find employment at one of the enlarged WTS bases, the same being true for his instructors, mechanics and other employes. Another opportunity — they may obtain positions as CAA inspectors. It is intended to place full-time inspectors at every WTS field, thus expediting the flight-instruction program generally.

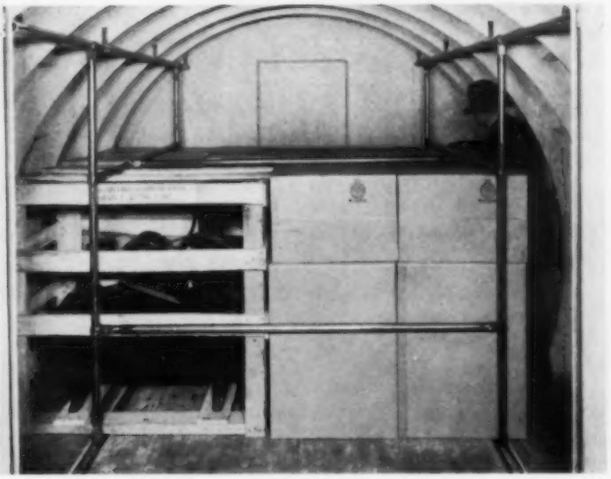
Finally, NATA rallied support to a proposal that flight-training under CAA be installed at high schools throughout the country, with women instructors handling that responsibility. To put this project into action, the first move would require the training of several thousand women as elementary flight instructors. They would be the first group to clear through the WTS non-military course. The training of high school students, if approved and authorized by the Congress, would utilize every WTS base left unused by the revised military system. In fact, to carry forward the high school flight training idea on any kind of national scale, it would undoubtedly require more instructional resources than WTS could find or create, even in normal times, within one year's time. Accordingly, if this move, backed by NATA proves to be successful, there will be more training work than could possibly be absorbed by several times as many operators as will be dropped in the WTS re-organization for military training.

NATA opened its headquarters office in Washington a year ago March 1. That office will continue to function in behalf of the nation's flight training efforts, as long as the war endures; and thereafter, prospects are that the office will need to remain there

TUBULAR DEVICE FOR AIR FREIGHT LOADING



COL. EDWARD S. EVANS, president of Evans Products Co., of Detroit, has stepped forward with another device and technique for air freight loading. The device consists of tubular members, shown at left above. Unusual flexibility, lightness, and dependable hold-down feature the system.



LOADED SECTION OF FUSELAGE shows how cargo is neatly fastened. Tubular members are adjustable at half-inch intervals. The members weigh about seven pounds each, come in lengths from four and one-half feet to six feet. Room is provided at right for an aisleway, permitting entry through the fuselage to the pilot's compartment.

CARGO REMAINS SECURELY in place with model at ninety-degree angle.

COMPLETELY ROLLED OVER, cargo fails to budge. Tubular members hold the load in suspension from floor.

indefinitely, or as long as the services of NATA are needed in collaboration with Government agencies in the furtherance of aviation, and specially the flight training division. That may mean permanent location of our principal center of activity at the national capital.

Looking to the future, NATA will devote much of its efforts in the year ahead to shaping up plans for the peace-time developments that are destined to occur in private flying and non-scheduled aviation. The war effort will not be — must not be — neglected. That objective will remain NATA's principal policy and activity through the "duration." Yet we realize that it would be foolhardy not to figure ahead to the day when war training will no longer be necessary.

About the Future

With the peace-time future in mind, NATA is studying several problems, but most seriously right now, the proposed legislation embraced in two bills introduced jointly in the Senate and House for amendment of the CAA Act of 1938. These bills, if adopted, will greatly strengthen CAA's supervisory authority over all civil flight and aircraft production. Our chief interest, of course, centers upon the flight-training section. The bills, identical in form and purpose, were introduced as S. 246 by Sen. Josiah W. Bailey, and H. R. 1012 by Rep. Clarence F. Lea. These measures are recommended to the attention of every individual interested in the long-pull

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THE Sky's the Limit

BY BILL GREEN

We have a fighting president—with guts . . . the Casablanca Conference. . . . Verily, this is an air war. . . . Bureaucracy crops out in Texas. . . Railroad Commissions should NOT regulate aviation. . . . it's the fees and the bureaucratic control they're after.

Flying President

WHATEVER the political beliefs of most of us may be, we must admit that the President's latest journey across the Atlantic, and around parts of North Africa, much of it through real war zone, is worthy of consideration. The only interpretation we can make of this hazardous trip—through wintry weather—and fraught with all the hazards of ocean *and* war travel—is that we have a fighting President—with plenty of guts.

We did not expect the announcement of the North Africa parley to contain all the details of the meeting and the plans arrived at. Therefore, we are at a loss to explain all the criticism of the meeting and subsequent announcements. No one told us that we were going to attack in North Africa in the first place. But we did attack—and successfully. The Germans were pretty mad that we didn't advise them before hand so that they could have been ready for us. When did they ever advise anyone before attacking? Anyway, the benefits of doing things unexpectedly—as far as the enemy is concerned—are so manifold that those people now hollering for complete information on the new plans simply set themselves down as plain dummies.

The thing we are plenty happy about is that there *was* a meeting of *all* the people immediately concerned with the present problem in North Africa.

To those who complain because Joe Stalin and Chiang Kai Shek were not there we have only to say that: While the Russians have certainly made the best showing of anyone in the war—so far—they are nevertheless fighting entirely on their own land. We wonder if they are as much allies of ours as they are simply a people defending their own land. We doubt that they will ever furnish manpower or equipment to aid us in our fighting. Significantly thus far they have avoided giving us rights to use Siberian bases to fight against Japan—and they are not fighting Japan.

The same thing holds true of the Chinese. They are brave—and we have not helped them as much as we should. Every bit of help we give them is just that much more done to the Jap. However, it is also doubtful if we will ever be offered help from China—outside of China proper. They haven't much except bare fists to offer us.

Therefore, it was not a problem that they could help us to solve. We have seen a lot of meetings where there were too many people present.

It seems that one of the outstanding results of the conference, as reported, was that the Frnech seem not to have learned their lesson. They still persist in hanging separately rather than getting together.

This was the first time in our history that a President was absent from the country in war time. It was the first time that the Commander-in-Chief of all the fighting forces had personally flown to gather first-hand reports and to collaborate with our allies on foreign battlegrounds. It is a tribute to aviation that this trip was possible. It is a tribute to all the men and agencies involved, that they were able to make all the arrangements and carry out the entire undertaking without once tipping their hands and letting the story out. From the news stories emanating from Germany, it is evident that they were completely in the dark on the whole affair. We believe that when the story is finally told—in detail—it will be another saga of aviation. This is an *air* war.

Bureaucracy Rears Its Ugly Head

Down in Texas, where they have the most and the biggest of everything, including bureaucrats, they have done it again. Or, they are trying to do it.

Senate Bill 51, 48th Session, Texas Legislature, introduced by one Senator Lovelady, is a lulu. It is a very bad bill. If it is honestly intended to do the job written out in the preamble, then it is a very strange approach to the job.

The bill proposes to "regulate transportation by aircraft, the operation, construction, repair and maintenance of aircraft, airports, landing strips, air navigation facilities, and instruction in the operation, construction, repair and maintenance of aircraft; defining terms and offenses, providing for the licensing of aircraft and pilot thereof . . . authorizing the expenditure of monies for the acquisition and operation of airports and landing fields, and for the advancement and safety of air travel . . . levying a tax of four cents a gallon on all gasoline used by aircraft" . . . and providing for taxes and license fees on all aircraft used privately, as well as all private or commercial pilots.

It provides for the Texas Railroad Commission being set up as the regulatory body. The Commission would be empowered to hire employes to administer the law.

Let us stop for a moment to consider this bureaucracy business—and what the present state of things is like: First, there is practically nothing now that a person may do, without obtaining a permit, paying fees, etc. If you could pay the fees by buying a stamp and pasting it on your airplane—or your license card—it wouldn't be as bad as having to stand in line for long periods, having lots of voluminous forms to fill out (these are all mentioned in some detail in the bill). Air transport was once fast. Now if one considers all the red tape imposed by different agencies—checking in and out of the airport—and even in the purchase of gasoline—it frequently is slowed down to automobile speed. How does anyone expect to *further* aviation by complicating it? Ask any business man today. He will tell you that he has 10 per cent of all his employes just filling out required forms for some government bureau. If we really want to help win the war, we should

reduce bureaucracy, red tape, questionnaires, gas tickets for aircraft, etc.

Second, the taxes are no minor items. It is proposed to tax each pilot—and we assume this means students, too—the small sum of $2.00 per year. The pilot shall be required to subject himself to, and pass, a physical examination by a state-appointed medical doctor, and the fee shall "not exceed $10.00". To us, that means $10.00. Therefore, on top of everything else, you will have to be out another twelve bucks per year. That is two-thirds of a war bond. Times 3,000 pilots in Texas would be 2,000 war bonds. Somewhere, sometime, someone is going to have to recognize that you just can't take away money from people—and then take away more of their money, and then take away a lot of their time, that they use to make money with, and still expect them to buy 10 per cent of their income worth of bonds, and pay taxes, and pay all the higher costs of living. Slicing it off both ends was ruled out by Ben Franklin, and a lot of other sages long ago. Instead of helping aviation, we bet it would immediately suppress it in Texas.

Then, they have a nice little plan to tax your airplane. They tax it to the tune of 2 cents per pound of pay load. Our airplane would pay $26.00 per year. That, on top of the use taxes, personal property taxes, high first cost, high upkeep, etc., just about breaks the camel's back. Incidentally, since, under this proposed bill, each airport, and each mechanic, and each repair station has to pay a license fee or yearly tax, it is to be assumed that those extra charges will just be passed right on back to the ultimate consumer—oooooh. That will be a large help to aviation—almost as much as making spark plugs illegal, or something of the sort.

It seems to us, too, that aircraft owners and operators should not have to pay the four cents per gallon highway gasoline tax, inasmuch as they do pay a highway gas tax when they use the highways, and they might not get any benefits from paying such a tax on aircraft gasoline. All the airports at present in the State of Texas are either federally or municipally or privately owned. Unless the state contemplates building a lot of airports in places where there are none at present, we don't know what they would do. If they did collect the taxes, they should go to the people who built the airports—but then, most of them are paid for, or have proper amortization schemes worked out—and we are the ones that have paid—and are paying for those facilities. We think it only fair that we continue to get tax-free gasoline.

Of course, we are not the ones to deny the right of the state to tax gasoline—if taxed to all consumers on the same basis. However, if farmers don't pay taxes on tractor gas, aircraft owners shouldn't have to pay it on aircraft gas.

In some respects, the proposed bill has merit. We simply believe that it is unnecessary, irrelevant and expensive. It would simply result in a lot more red tape—additional expense, more state expense, more people on the state payroll.

The State of Oklahoma had such a law—passed in a fit of legislative enthusiasm. Most pilots and aircraft owners ignored it completely. Nothing was ever done about it. It didn't help any, and didn't do any of the things it was supposed to do. It was simply duplicating all the regulations and difficulties of the CAA. After all, aviation is now too well regulated by the Federal government. They have gone to such great lengths to protect and save the lives of all those dummies who have always been determined to kill themselves at an early age, in spite of everything anyone could do about it, that they have dog-gone near killed private aviation.

We suggest that you wire or call your senator or representative and tell him your views on the matter. They will do what you want them to do. We suggest you tell them to concentrate on winning the war.

PROPHECY

(Continued from page 44)

tallic barometer (aneroid *altimeter*), *automatic rudder control* by compass, elevator control by pendulum which also could act as a *ground annunciator*, air pressure "feelers" operating signal bells, anenometers (*air speed meters*), and inclinometers or *angle of attack indicators*.

There were other features—the vertical fin to assure stability of direction, air brakes to aid in steering, approximations of ailerons—but these outstanding points provide, for our purposes, a sufficient outline of the amazingly complete and detailed plans drawn up by this pioneer genius of aviation so many years ago.

Would the plane fly?

It isn't likely that we will ever know, although the author believes that Penaud's plane, as built by Gauchot, would have flown. For such a plane actually was built, but this glory of achievement was not to be the inventor's. The plane, so carefully thought out, so painstakingly constructed, was wrecked in a squall the night before its trial was scheduled.

The inventor's means were limited, adding the pinch of financial need to the physical handicap under which he had labored so devoutly. His friend and associate, Gauchot, was killed about this time by a railway engine. Penaud grew despondent and somber, and broke with the French Society for Aerial Navigation, which he had helped to establish.

In vain he sought the aid of others, including Giffard, the balloonist. At last, in 1880, utterly discouraged, he brought his career and his life to their tragic close. Placing his various projects in a small casket, he entered his house and shot himself. He was just thirty years old.

THE CONSTELLATION

(Continued from page 30)

Hot Wing De-Icer

Although the first Constellation may not have the hot wing de-icer, the later ones will. The first United States airplane that ever had hot wing de-icing was a specially equipped Lockheed Model 12. As a result of tests made by the NACA in this Model 12 airplane, the use of the exhaust heat for de-icing of wings, rather than the rubber type boot over the wing leading edge, has come into prominence for all modern aircraft. Many airplanes are now being converted to this type of de-icing equipment. The later models of the Constellation will incorporate this type of de-icing.

Maneuvering Fowler Flaps

One of the novel features incorporated in the design of this airplane is the use of maneuvering Fowler flaps. This means that a particular setting of the flaps is designed so that the airplane has excellent maneuverability characteristics at low speed and consequently can climb rapidly or maneuver at slow speeds during icing or other particularly bad weather conditions.

This permits the combined safety of a more lightly-loaded airplane with the high performance that is characteristic of the Constellation.

The full deflection of the Fowler flaps is used only at landing to permit a minimum landing speed.

Lockheed engineers believe that the Constellation combines more safety features and devices than any other airplane.

SHAKE-UP SCHEDULE

(Continued from page 47)

future of civil and commercial aviation.

NATA is the first association of non-scheduled operators that ever kept going beyond the initial year. Now in our third year, we have demonstrated the capacity to hold our forces together for the improvement of flight-training services and other aviation enterprises such as conducted on fixed bases. We foresee the growing importance of our industry; therefore, the increasing importance of keeping our organization actively in the forefront, working continually for the best interest of the little fellow in the aviation industry. NATA proposes to give the nation its best in the war effort, and thereafter to continue delivering our strongest support behind all moves intended to advance individual participation in aviation.

To foster those purposes, we invite the support of all individuals and institutions having any part, or connection of any kind, in the business, of training men and women to fly.

JUST AMONG OURSELVES

(Continued from page 12)

tor to die—not for the sake of the little operator, who wants no sympathy, but for the sake of preserving and utilizing the greatest pilot incubator the world has ever known. If nothing else, they can devise some means to furnish a little extra equipment and spare parts and allocate high school students below draft age to them for primary ground and flight instruction. There is not a modern high school in the nation that cannot do almost as effective a job in aviation ground school courses as many of the colleges and I am firmly convinced that the Army is waiting too late in the game to provide rudimentary aeronautical instruction for the youth of America who are hungry for the opportunity to fly. They still haven't convinced me that good pilots can be drafted.

However, who are we to criticize the Army and their training policy? They probably have sound reasons for everything they do, but I cannot forget how many times I have read an official release beginning, "the Army Air Forces announced today an important expansion of their use of CAA training facilities." What happened to the glider program which caused so much excited talk and speculation late last summer? From all I can gather it has been decimated.

There seems to be no one left in Washington strong enough or willing to carry on the fight. Check back over the past year and you will find the old guard in the CAA has departed for other climes, in industry or in the Army or Navy with commissions. Defeated politicians and unheard-of appointees are taking their places.

It appears now, with the Army's new WTS announcement, concentrating this phase of Army flight training into approximately one hundred colleges, and with the civil aircraft freezing order which presumably was contrived to guarantee enough flying equipment for this program, there need be no more fear of civil aviation being grounded for the duration. It will ground itself eventually because you cannot wear out flying equipment at the rate it is being worn out today and expect it to survive without replacement. Death to private, civil aviation is automatic.

Our only hope for the continuation of civil aviation lies in CAP, one of the few remaining agencies where the traditional volunteer spirit of America still survives. My belief in this fact is my reason for listing as a momentous announcement the release by the Army Air Forces official publication that the CAP Coastal Patrol is carrying bombs. The truth has not been known about CAP on active duty because we have been prohibited, and rightfully so, from discussing or revealing anything of these operations with military significance.

I regretted to see the letter from a CAP pilot published in *American Aviation* last month. The pilot who wrote that letter spoke many truths, but fundamentally he is considerably off the beam. I think he should join the Army rather than work for the volunteer organization of men in civil aviation trying to relieve the Army as an auxiliary. The hardships and the dangers and the sacrifices mentioned in the *American Aviation* letter are not peculiar to CAP Coastal Patrol. The problems of proper equipment are just as keenly felt in many branches of the Army and Navy Air Forces as in our operation.

CAP volunteered to do this job with the equipment on hand and asked for nothing. Through improvisation and ingenuity CAP believed they could take on specific jobs of a military nature, even tactical operations which are being performed today, without being a burden to anyone.

Sure, it's tough! It was plain, unadulterated hell to go so long without proper flotation gear and to operate on low, static-bound frequencies, and to keep airplanes of the vintage of the early thirties grinding out the hours without sufficient shop equipment and competent mechanics. But, all those problems and headaches have been overcome through improvisation and ingenuity. The laments of the pilot whose letter was published in *American Aviation* are untimely as well as unfortunate, because his alarmist attitude is not the spirit of the Coastal Patrol bases I have visited.

Civil aviation is also being kept alive back in the hinterlands through the local squadrons of CAP who are finding new, interesting, and war-serving jobs every day. These activities must be distinguished from active duty CAP missions, but they are none the less important in their value and significance.

Remember months ago how we used to discuss and editorialize on the great possibilities ahead, CPT functioning at full blast with pilot training and the rest of civil aviation banded together in a semi-military manner, ready on a moment's notice to carry out any job they would be called upon to do according to necessity and their ability?

CAP now has some 65,000 members owning and operating several thousand airworthy airplanes of all descriptions. But the life of CAP, like the life of WTS, will be measured by the life of the flying equipment which will begin now to go out of service and increasingly worsen steadily henceforth. The Army Air Forces and the War Production Board could do something about it without the slightest detriment or visible drain on the stockpile of scarce material or machine tool facilities or depleted manpower reserves.

But, as pointed out, there seems little hope for any such planning because there is no one in Washington save for the small but sturdy group of AAF officers assigned to CAP, who will carry the banner of private aviation. It is already the eleventh hour and unless something is done by April on the parts problem our days are numbered. The only other alternative is the design and construction of new types of airplanes for these specific jobs so earnestly needing filling, but there are no straws in the wind that even suggest such a solution has been proposed. One, two, or possibly three, aircraft manufacturers could easily provide a small portion of their present facilities for this assignment, and no doubt would feel very fortunate if chosen, because it would make the transition from war-time production to peace-time production far simpler. But at this time, there is no peg to hang a hope on.

Sincerely,

George

BOOK REVIEWS

Visibility Unlimited, *by Lieut. Ernest G. Vetter, USNR, published by William Morrow & Co., Inc., 386 Fourth Ave., New York City, price $4.00.*

In this book by the author of "Let's Fly" and "An A B C of Flying," the reader learns, as though from practical experience, how to make flights under various conditions. Presented in full detail, the related subjects of meteorology and navigation are explained with such practical simplicity and clearness that they can be readily understood by readers with no technical background.

Starting with an explanation of the atmosphere surrounding the earth, the reader is taken step by step, to the planning and execution of an actual flight. Through the use of concrete examples, the essentials of navigation, and the questions of latitude, longitude, time, distance, etc., are cleared up. The use of navigation computers and all vital navigation instruments, including the gyro instruments, are thoroughly explained. And the hundreds of sketches and diagrams that accompany the text illustrate graphically what the author is explaining.

Outstanding New Aviation Defense Books

COMMERCIAL and PRIVATE PILOTS: New "Aeronautical Training" fully covers new multiple choice examinations, with drift off course and alternate airport problems plotted and solution given. Commercial examinations are shown in separate section of the book. Navigation, Meteorology, Aircraft, Engines and CAR covered. Just published—12th edition only $3.00 postpaid, or C.O.D.

RADIO and INSTRUMENT FLYING: by Charles A. Zweng, Instructor, U. S. Air Corps. New 1941 Edition covering new important material. Written especially to prepare the pilot for government examination for "Instrument rating." Radio-Telephone Permit included with Meteorology, Radio-Orientation, let-down, offcourse and alternate airport problems. Only $4.00, postpaid.

A. & E. MECHANICS RATING: Airplane and Engine Mechanics—Can you pass your written test? Send for new quiz book covering Airplanes, Engines, and Mechanics' Civil Air Regulations. 156 pages, fully illustrated, with new multiple choice examination questions. Only $3.00, postpaid or C.O.D.

FLIGHT INSTRUCTOR: A new quiz text covering the scope of the new multiple choice examination for flight instructor rating. Illustrated with diagrams. $3.00, postpaid, or C.O.D.

GROUND INSTRUCTOR: Written for the student preparing for "Ground Instructor Rating." Excellent for class work. Covers Navigation, Meteorology, Aircraft and Theory of Flight, Engines and Civil Air Regulations. $3.00 postpaid or C.O.D.

GROUND INSTRUCTOR RATING: Contains "Multiple Choice" examinations on Navigation, Meteorology, Aircraft and Theory of Flight, Engines and CAR. Nomenclature and aviation dictionary in back of book. It's new and different. Something you cannot afford to be without. $3.00 postpaid. Or it may be purchased in combination with "Ground Instructor" for $5.00.

NAVIGATION PLOTTER: (Dept. of Commerce type) is necessary for all problems involving drift, letdown and offcourse, including alternate airport problems. May be used when taking examination. Complete with large leatherette Navigation Note Book and instructions, only $4.00 postpaid.

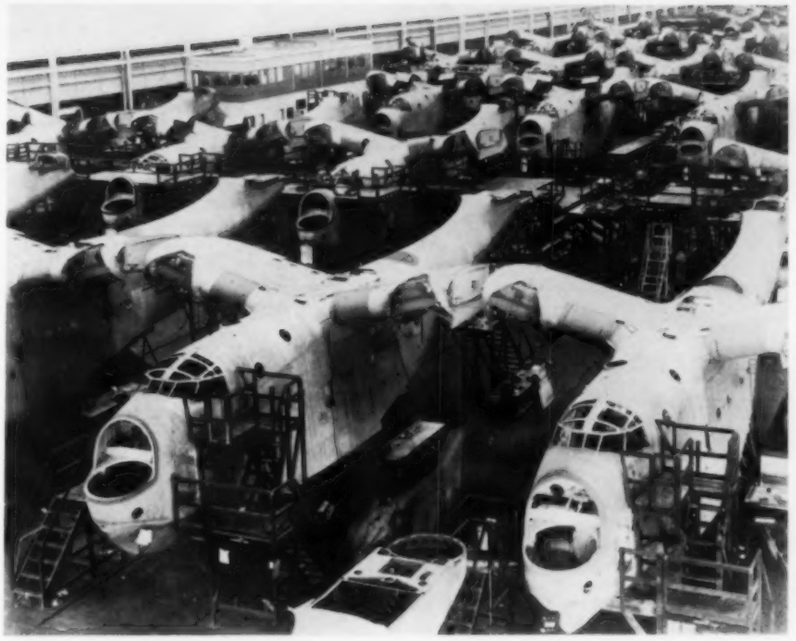
AIR NAVIGATION (Gold Medal Edition) includes meteorology, $5.00 postpaid.

METEOROLOGY: New edition for pilots by Lieut. Commander Halpine. $2.75 postpaid or C. O. D.

SIMPLIFIED CELESTIAL NAVIGATION by P. V. H. Weems and E. A. Link, Jr. $3.00 postpaid.

U. S. COAST AND GEODETIC (Lyon) AIRCRAFT COMPUTER with book of instructions. $3.00.

Pan American Navigation Service
12021 Ventura Blvd., North Hollywood, Calif.



GROWING SUBMARINE MENACE to Allied shipping in the North Atlantic will be met in part by new fleets of Navy "Mariner" patrol bombers operating far from their bases. This first photo of the Mariner production line at the Glenn L. Martin Company shows many of the twenty-four-ton flying boats moving down the final assembly line.

Air Navigator's Log, *by Charles A. Zweng, published by Pan American Navigation Service, 12021 Ventura Boulevard, North Hollywood, California, price $2.00.*

Here is something new—brought on by our advance in navigation of the air. Mr. Zweng, who has written numerous books in the aeronautical field, is to be congratulated on bringing to the air navigator this timely log book, especially designed for trans-oceanic navigation of the air, but equally invaluable to every pilot making cross-country flights.

Ample pages, handily spaced and ruled, provide for pertinent information covering: Date, Departure, Destination, Distance, Time, Weather Conditions, Pilot, Plane Number, and Cruising Altitude, Etc. The book contains spaces for the name and address of the navigator, and the final page sets out a handy "radius of action table" for each hour of flying time available.

Jordanoff's Illustrated Aviation Dictionary, *by Assen Jordanoff, published by Harper & Brothers, 49 East 33rd Street, New York City, price $3.50.*

This unique pictorial dictionary fills a long-felt need, not only among those already engaged in aviation, but also for the thousands of people newly concerned with aviation, from the air-minded youth in school to the average news reader who is trying to grasp the scope and function of aviation in modern warfare.

The 415-page volume, which defines more than 2,000 aviation terms, and visualizes to the reader every term described, serves a dual purpose—first, in simple words it takes the mystery out of aviation's jargon; then it shows each term in picture form, an art which Jordanoff has successfully featured for many years in his previous aeronautical books and which has made him a world-wide authority as a writer on aviation subjects.

The dictionary concludes with a glossary of aviation "slanguage" — everything from "Ace" to "You've had it!" and including those mythical little elves which airmen know as "gremlins" and about which the general public is just learning.

Planisphere of Air Navigation Stars, *published by The Chemical Publishing Co., Inc., 234 King St., Brooklyn, N. Y. Price 75 cents.*

This consists of an eight-page booklet of charts and instructions by Francis Chichester, Flight-Lieutenant, RAFVR and author of "The Observer's Books on Astro-Navigation."

Meteorology and Air Navigation *by Bert A. Shields, Lieut. Comdr., USNR. Published by McGraw-Hill Book Company, New York. 285 pages; price $2.25.*

This book—a revision and expansion of Parts III and IV of the author's well-known *Air Pilot Training—is written by* a pilot *for* pilots. The subjects are presented in a simple, nontechnical style and may be read rapidly by those who wish to gain a general knowledge of the principles of aviation.

A chapter on navigation problems has been added to assist the student in solving several types of problems that have recently been given considerable prominence on the pilot's written examinations.

The various steps in solving off-course problems are carefully explained and several typical problems are solved. The book is illustrated with numerous photographs, diagrams and charts.

Aircraft Spotter, *by Lester Ott. Published by Harcourt, Brace and Company, New York; 1943 Edition, price $1.00.*

Every American—civilian or fighting man—needs to know how to tell one airplane from another and describe them—quickly and accurately. This book, which tells how to identify the principal war planes of *all* the great powers—the United States, Great Britain, Germany, Italy, Russia, and Japan—is used extensively by the Army and Navy for training spotters in our fighting forces.

United Reconstitutes Chance-Vought and Sikorsky Units; Helicopter Work Intensified

United Aircraft Corporation has reconstituted two of its original airplane manufacturing divisions—Chance-Vought Aircraft Division and Sikorsky Aircraft Division. They had been consolidated and operated as Vought-Sikorsky Aircraft since 1939.

Chance-Vought will concentrate on combat aircraft; Sikorsky on development of the helicopter for military and commercial purposes.

Igor I. Sikorsky will continue as engineering manager of the Sikorsky aircraft divison and Rex B. Beisel has been named engineering manager of the Chance-Vought aircraft division. For the present both divisions, which will continue to operate under the general managership of Charles J. McCarthy, will jointly occupy the existing office and factory facilities at Stratford, Connecticut.

Aero Chamber Revived on "Streamlined" Basis

Reorganized at its annual meeting in New York on January 22 with most of the companies which recently resigned now reinstated, the Aeronautical Chamber of Commerce is "streamlining" its activities to fit a greatly reduced budget for 1943.

Irving Taylor, secretary, was named manager pro tem upon the resignation of Robert P. Newton, senior vice president. Board of governors membership was reduced from thirty-two to fifteen and a committee of six was appointed to effect the re-organization. This committee will include the presidents or their representatives of the East Coast and West Coast councils, Charles Marcus of Bendix Aviation Corp., Rudolph Deetjen of the Aviation Corp., C. S. Jones of the Casey Jones School of Aeronautics and a member of the Chamber's special committee on reorganization, who was to be named.

A new board of governors and officers will be elected.

Consolidated-Vultee Merger Approved by Directors for Maximum Plane Production

Stockholders of Consolidated and Vultee have been asked to approve the merger of both aircraft concerns into perhaps the largest such enterprise in the world.

The merger already has the okay of directors of both companies.

"The merger of the two companies," says Tom Girdler, chairman of Consolidated and Vultee, "has been under consideration since Vultee acquired 34 per cent of Consolidated's outstanding stock at the end of 1941. Winning the war is the sole objective now — and this means maximum aircraft production." Consolidated and Vultee cover the entire range of planes from the largest bombers and transports to basic trainers and "flying jeeps."

The new concern's name: Consolidated Vutee Aircraft Corporation.

Fast Flying Boat with Davis Wing to Be Built by Consolidated in New Orleans Plant

Consolidated is converting the former Nash-Kelvinator plant at New Oreans for production of what it believes is the fastest military flying boat in the world—the Model 31, or P4Y.

The speedy Model 31 is a fighting modification of a boat which Consolidated launched in San Diego bay in May, 1939.

Model 31 was designed originally with the revolutionary Davis wing, Consolidated's big "gamble" which brought so much success when adapted for the B-24 Liberator land bomber.

It carries two 2,000 horsepower Wright Cyclone engines. Its hull gives it the nickname, "pregnant guppy."

Purpose of the Model 31 is for fighting patrol work or as a cargo carrier. Rear Admiral Ralph E. Davison of the Navy's bureau of Aeronautics, lauded the new flying boat as a plane effective for both combat and cargo.

There are two reasons why the Model 31 didn't go into mass production immediately. The 2,000 horsepower engines used were experimental and not until recently produced on a large scale. Secondly, the boat was built for commercial use and had to be redesigned with latest combat knowledge.

The New Orleans plant now is being tooled for mass production of the Navy's new P4Y, and it should be rolling off the line by fall, says Consolidated's general manager, I. M. Laddon at San Diego.

"Little WPB for Air" Completes Big Tour

Charles E. Wilson, WPB vice chairman for aircraft production, has returned to Washington with a group of officials after a nine-day trip to aircraft plants in the Southwest and Pacific Coast areas.

In the party with Wilson were Lt. Gen. William S. Knudsen, in charge of production, U. S. Army; Maj. Gen. Oliver P. Echols, commanding general, material command, AAF; Rear Admiral Ralph E. Davison, assistant chief, bureau of aeronautics, Navy Department; and T. P. Wright, director of the Aircraft Resources Control Office.

Manufacturers Aircraft Association Elects Officers

S. S. Bradley was re-elected chairman of the board of the Manufacturers Aircraft Association at the annual meeting held in New York. Frank H. Russell will continue as president and John A. Sanborn was re-elected general manager. The association administers the patent cross-licensing agreement for the airplane industry in the United States.

The following vice presidents were elected: Edgar N. Gott, Consolidated Aircraft Corporation, San Diego, Calif.; R. E. Gross, Lockheed Aircraft Corporation, Burbank, Calif.; Joseph T. Hartson, The Glenn L. Martin Company, Baltimore, Md.; J. H. Kindelberger, North American Aviation Inc., Inglewood, Calif.; John M. Rogers, Douglas Aircraft Company, Inc., Santa Monica, Calif.; William E. Valk, Curtiss-Wright Corporation, New York; Eugene E. Wilson, United Aircraft Corporation, East Hartford, Conn.

In addition to the above, James P. Murray of Boeing Aircraft Company, Seattle, Wash., was made secretary and Clayton J. Brukner, Waco Aircraft Company, Troy, Ohio, was re-elected treasurer.

The new board of directors for 1943 elected at the annual meeting is comprised as follows: S. S. Bradley, chairman of the board; Clayton J. Brukner, Waco Aircraft Company; Alexander T. Burton, North American Aviation, Inc.; Charles H. Chatfield, United Aircraft Corporation; Frank N. Fleming, Douglas Aircraft Company, Inc.; G. Sumner Ireland, Lockheed Aircraft Corporation; George D. Jones, The Glenn L. Martin Company; James P. Murray, Boeing Aircraft Company; Raymond S. Pruitt, Consolidated Aircraft Corporation; Frank H. Russell, president; William E. Valk, Curtiss-Wright Corporation; Ray P. Whitman, Bell Aircraft Corporation.

Ryan Working on New Navy Combat Plane

Ryan Aeronautical Company announces that it is adding to its training equipment production a new combat plane for the Navy.

President T. Claude Ryan says they'll taper off on the Ryan SOR-1 Navy scout observation type and go into production of major aircraft components for prime contractors during the changeover. What the San Diego plant will turn out for the Navy is hush-hush. But Ryan has the Navy requirements and will design its own ship.

Serious Acetylene Shortage Forecast by Government

The government has called on the Oxygen and Acetylene Industry Advisory Committee to help in the face of a serious shortage of these vital materials. It is predicted that stocks of calcium carbide, for making acetylene, will be rationed severely. Requirements will be "considerably greater than production for several months" says the Office of War Information.

American Propeller Corp. Boosts Plant Capacity

American Propeller Corporation of Toledo announces a 50 per cent plant capacity increase which will make it the largest producer of hollow steel propeller blades in the country.

President William F. Wise says that the shipments are now approximately two months ahead of contract schedules, with production increasing monthly.

The American propellers are made from single pieces of chromium-nickel-molybdenum seamless steel tubing. They are made to withstand corrosion and abrasion and the larger sizes are lighter than the aluminum products.

Super-hard Rivets Perfected by North American to Replace Bolts, Lighten Weight of P-51 Wing

Development of a super-hard rivet strong enough to replace bolts on aircraft or other structures has been announced by North American Aviation, Inc. The new rivet, now expediting warplane production, has considerably lightened the weight of the famous "laminar flow" wing of the P-51 Mustang fighter.

Use of the new rivets, it was disclosed, has effected a 60 per cent weight reduction in relation to the equivalent bolts and rivets previously used. Nearly 1,000 of the new rivets, which can be installed five times faster than bolts, are used in the Mustang's wing, replacing a large number of regular rivets and 798 heavier bolts.

The secret of the new rivet, which has been named the "Hi-shear" rivet, is in the method of installation. With a shear strength of 75,000 pounds per square inch, compared with a normal rivet's shear strength of 25,000 pounds per square inch, the Hi-shear rivet is too hard to be driven in the usual manner. Instead, it is installed by a special tool that presses a tiny aluminum alloy collar into the notched end of the stud, leaving a modified conical head. Excess length of the collar is sheared off automatically by the tool during the operation by pressure against the sharp edge on the tip end of the stud.

The new rivet was developed by George Wing, a North American Aviation engineer, who also invented a special tool employed in the riveting operation. The rivets come in two styles of heads, in several diameters, and in lengths to suit all conditions. Two or more regular rivets are required to equal the strength of one Hi-shear rivet, it was revealed.

The new rivets are being made available to other war manufacturers.

Pesco Enlarges Test Facilities at Cleveland

The Pesco division of Borg-Warner has increased experimental facilities and added to engineering and other personnel for its aircraft production.

Facilities include an explosion-proof room for testing aircraft fuel systems which has been pronounced the best in the country; an explosion-proof endurance test room for checking fuel system units; and an endurance test panel on the plant roof at Cleveland to permit endurance testing in open weather. Another endurance test room accommodates units which do not require explosion-proof safety.

Dynamometers at one-tenth to fifty horsepower, with a 150-horsepower dynamometer soon to be installed; variable speed calibrating stands, and various altitude chambers help check Pesco aircraft products.

Panagra Again Wins International Safety Award

For the third year of its presentation, the International Aviation Safety Award has been bestowed upon Panagra—Pan American-Grace Airways—for operations in 1942 without a fatality in South America.

The award was presented in New York City and recognized Panagra's safely flying 42,964,911 passenger-miles—or 4,026,711 flying miles—over its 8,800-mile network.

For five years and six months, during rapid expansion, Panagra had no South American fatalities until January 22 when it lost a plane and fifteen persons in Peru. One of the eleven passengers survived. That was the first fatal accident in 110 million passenger-miles.

Of 10,000 Suggestions, Boeing Adopts 400

So far, more than 400 of the 10,000 suggestions turned in by employes at the Seattle plant have been adopted by Boeing Aircraft Company. The helpful hints that clicked were rewarded by some $6,000 in cash prizes alone. The ideas are still being studied, and an employe may patent his dream-child if he wishes.

Hundreds more suggestions are being turned in by plant employes at Wichita, Kan., and Renton, Wash.

Executive Training for Workers

Ten of Curtiss-Wright's airplane division employes have been named for a fifteen-week executive training course at Harvard. It is part of the war training program outlined by the U. S. Office of Education to equip men for more responsible jobs in their factories.

Campaign Mapped to Reduce Work Accidents

Something is being done about the rising tide of accidents and the resultant loss of manpower in communities producing our tools of war.

A tour to enlist industrial and civic leadership in a safety campaign is being conducted through war centers by William A. Irvin, national chairman of the War Production Fund to Conserve Manpower, and Col. John Stilwell, president of the National Safety Council. Irvin formerly was president of U. S. Steel.

After enlisting the aid of fourteen leading war communities against lost time and man-hours, they are going to ask similar drives in each of the ninety-two cities of the nation having a population over 100,000.

How GE Helps Aviation

General Electric's report to stockholders says that its aeronautical business is now "several thousand times what it has been previously."

As GE puts it: "Pilot and navigator, bombardier and gunner, have become directors rather than manipulators. They can stand and fight when attacked, safe in the knowledge that their ship will literally fly itself with the aid of relays, switches, contractors, solenoids, and many other electric devices drafted from peacetime occupation and given the uniform of the air force."

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Waco Honors Arcier, Chief Engineer of Firm

A. F. ARCIER

Waco Aircraft Company's recent officer-expansion saw its chief engineer, A. F. Arcier, elected to the new office of vice president in charge of engineering, and also to the board of directors. R. E. Hoefflin, re-elected treasurer, became a new board member.

Headed by C. J. Brukner, president, all officers and directors were re-elected. The Waco offices are in Troy, Ohio.

Jouett Features SAE Meeting in Dallas

Col. John H. Jouett, vice president and general manager of Higgins Aircraft, Inc., of New Orleans, was scheduled to speak briefly in Dallas on February 10 at a meeting of the Texas section of the Society of Automotive Engineers. A special attraction was to be the presence as guests of about fifty members of the SAE's Aircraft Materials and Processes Committees, in Dallas for important sessions. Allen Guiberson, executive vice president of the Guiberson Diesel Engine Company of Dallas, is chairman of the Texas section.

B-24 Parts Supplied by 1,400 Manufacturers

The 315,000 separate and distinct parts necessary for a Consolidated B-24, come from twenty-eight states and the Province of Ontario, Canada. These thousands of parts are assembled in Consolidated's mammoth plants in Texas and California, in the Oklahoma plant of Douglas Aircraft, and at Henry Ford's Willow Run. Some 1,400 manufacturers supply parts made in almost 1,500 factories.

"T" Award for Universal

Universal Building Products Corporation of Dallas has been awarded the "T" emblem for the Minute Man Flag by the Treasury Department, according to J. P. Travis, President. Universal employes hold the record of having 10 per cent of the entire payroll going to the purchase of War Bonds and Stamps.

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For Cutting Everything — Even Wood

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Keystone Executives Promoted

Fred Spaulding, Keystone Tool and Supply Co., has been transferred from Dallas to Phoenix, in charge of the Arizona-San Diego territory. Mr. Spaulding announced that Howard Hutchinson, formerly the Keystone Representative in Wichita, has been transferred to Dallas to handle the Texas-Oklahoma business.

Interstate Making Own Military Planes; Promotes W. E. Hirtensteiner

Interstate Aircraft and Engineering Corporation, now making complete military planes of its own design, announces the elevation of W. E. Hirtensteiner as executive vice president. He is only thirty-five, but was the first man in the shops hired when Vultee Aircraft was organized by Don P. Smith. He left Vultee with Smith and Lee B. Cameron when the three took over management of Interstate in 1938 at Los Angeles. Two other plants are at El Segundo, Cal., and DeKalb, Ill.

Kinner Elects

Two veteran members of the Kinner Motors, Inc., family at Glendale, Cal., have been elected as new officers. They are Gunnar Edenquist, former sales manager, now vice president and assistant to President Earl Herring; and Walter G. Milka, production manager, now vice president in charge of production. Both men worked in the inspection department in 1929; Milka rose to production chief, Edenquist to chief engineer before their latest promotions.

Ellington Joins Council

KEN ELLINGTON

Ken Ellington, popular director of radio publicity for the Aeronautical Chamber of Commerce, has joined the Aircraft War Production Council, East Coast, Inc., as director of information. He was formerly with the Columbia Broadcasting System as announcer of special events, producer and director.

How Absenteeism Hurts

Ryan pulls no punches in a graphic production-loss chart it's issuing for absentee employes. The chart is entitled "Don't show this to your friends in the service" and for good reason.

"We lose one full day's production time out of every eleven because of absent workers," says the pamphlet.

Dick Depew Joins Fairchild at Hagerstown

R. H. DEPEW, JR.

Richard H. Depew, Jr., who learned flying at Maurice Farman's school at Buc, France, in 1911, has assumed duties of production co-ordinator at Fairchild Aircraft, Hagerstown, Md.

Depew recently was executive vice president and general manager of Taylorcraft Aviation Corporation until it was sold. He has spent thirteen of twenty years in the aircraft industry in one capacity or another for Fairchild interests. His aeronautical engineer work has taken him up and down the hemisphere, and he's flown 135 types of planes in his career.

Magnaflux Opens Dallas District Office

Magnaflux Corporation of Chicago has opened a district office in Dallas to meet the increased expansion of the aviation industry in the South. C. D. Havens, formerly an engineer for Western Electric, is now district manager in charge of Kansas, Oklahoma, Arkansas, New Mexico, Louisiana, Tennessee and Texas. The office and laboratory will have engineers to inspect and completely overhaul all types of Magnaflux, Magnaglo and Zyglo equipment.

Vultee Promotes Creager at Nashville Plant

J. R. Creager, who, among other aviation experiences, put the final check on several round-the-world planes, now is chief of the Vultee inspection department in the Nashville plant.

Creager has been with the factory since its inception. He has seen the evolution of Vultee planes from commercial type to Army observation to the present crack Vultee Vengeance dive bomber now in mass production.

New Aircraft Brokerage Opens at Love Field

The National Aircraft Brokerage, Love Field, Dallas, Texas, recently has been opened to handle the demand for used aircraft, parts, and supplies. According to W. E. Koup, president of the firm, there is a definite need for such a service because new equipment and supplies for private flying are at a standstill for the duration.

National Aircraft Brokerage will operate from coast to coast, border to border, and a list of available equipment can be had upon request.

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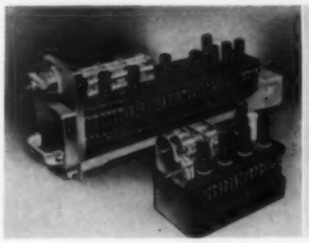
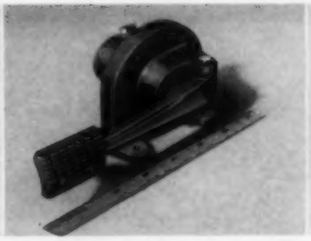


New Cell-Type Radio Receivers

Featuring a radically new method of assembling radio receivers from three basic cells and using only one type of tube in the entire circuit, the Electronics Division of the Harvey Machine Co., of Los Angeles, has announced a new line of "unitized construction" receivers. They are an assembly of four or more "cells," each being a complete element of radio circuit. Three types of cells —R. F. units, I. F. units and audio amplification units, are said to eliminate about 95 per cent of the hook-up wire usually required and to permit use of one type of tube in place of six or more different types. Pictured above is a four-cell receiver for mobile equipment and behind it is a nine-cell aircraft receiver incorporating automatic direction finding, four frequency bands and which operates from either a loop or antennae or both.

Small Rotary Table

The Duro Manufacturing Company of Los Angeles is producing a new six-inch rotary table with a height of two and one-eighth inches and a net weight of fourteen and one-half pounds. Its worm gear ratio of sixty to one is versatile for tool making, layout, inspection and production. Easy reading is assured with a beveled dial accurately cut and graduated to tenths of a degree. Two "T" slots cross at ninety degrees, forming four quadrants. A "T" lock screw is provided. The center hole is five-eighths-inch in diameter and all moving parts are easily lubricated.



New Brake Cylinder

The Scott Aviation Corporation of Lancaster, N. Y., has designed and developed a brake pressure cylinder for use with hydraulic brakes on many types of light aircraft. Now ready for installation on Cubs, the accessory can be supplied on an A-1-J priority or better with complete instructions for installation. Pedal location is similar to front brake pedal location. The Scott Brake Pressure cylinder weighs only twenty-three ounces.

New Sanitation Material

A new, three-purpose sanitation material, recently developed by Oakite Products, Inc., New York, N. Y., is reported to be the answer to many of the sanitation problems now confronting safety directors, engineers and inspectors in aircraft, engine and accessory manufacturing plants.

New Portable Electric Sander

The Sterling Tool Products Company of Chicago has announced a new portable electric sander counterbalanced against vibration and powered by a 1/5-h.p. Universal motor cooled by a turbine-type fan. Gears and counterpoise mechanism are sealed in dust-proof cartridge type case and moving parts are supported by oversize ball and needle type, plus one sintered bronze bearing. Detachable sanding pad takes 1/3 sheet of standard abrasives and is made flexible to permit sanding curved or flat surfaces. Lapping and polishing operations are performed by using felt or cloth matrix on sanding pad.

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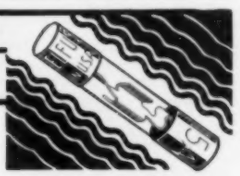

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Greater Federal Control Proposed in Bills to Revise CAA Legislation

Far-reaching provisions feature bills introduced recently by Rep. Clarence Lea of California (H.R. 1012) and Sen. Josiah Bailey of North Carolina (S.B. 246) which were proposed to revise the Civil Aeronautics Act of 1938.

The bills seek to make all civil aviation an auxiliary to the armed forces and instruct the CAB to encourage the transportation of persons and property by "air contractors" in order to "foster a market for aircraft manufacturers, promote skill in the operation and maintenance of aircraft, develop new and additional uses for and types of aircraft, and provide facilities for transportation by air supplementary to the air transportation system of air carriers."

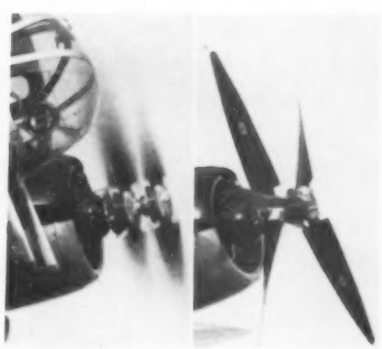
The Civilian Pilot Training Program would be made permanent.

The bills seek to prohibit the separate states from regulating air commerce, ban "multiple" taxation of air carriers and contractors by the states, and would amend the definition of interstate air commerce so that it would not be limited to commerce between points in different states but would include air commerce between points in single states.

Texas Senator Would Regulate Air Through Railroad Commission

A bill introduced in the Texas state senate by Sen. Karl Lovelady of Bosque County seeks to declare state sovereignty of the air space and has been vigorously attacked by the Texas Private Fliers Association and others because of provisions which would impose many restrictions, fees and license requirements on all forms of aviation.

A duplication of CAA measures in many ways, the bill would also reinstate a state tax of 4 cents per gallon of aviation gasoline and would vest control of aviation in the state railroad commission.



FIRST AMERICAN-BUILT counter-rotating, constant speed propeller to fly in this country was this one shown on a plane at East Hartford, Conn. Hamilton Standard perfected the propeller. Use of the twelve-foot propeller gives added blade area without increasing breadth or length, overcomes torque and enables the rear blades to recover from the front ones an amount of rotational energy ordinarily lost in the slipstream.

Single-Engined Planes of 500-h.p. or Less and Link Trainers "Frozen" by WPB for War Training Service

The War Production Board has issued General Limitation Order L-262 prohibiting transfer of all single-engined aircraft of 500 horsepower or less and Link trainers. The action, requested by military and civil authorities concerned with pilot training, freezes about 22,000 planes and all Link trainers in the hands of their present owners, restricting their transfer except by the armed forces, the government, licensed carriers and manufacturers.

Violation of the order is punishable by fine or imprisonment.

The order specifically states that "no single-engined aircraft of 500 h.p. or less, nor any Link trainer, nor any interest therein, shall be sold, leased, traded, rented, given or delivered by any individual, partnership, association, business trust, corporation, or any organized group of persons (whether incorporated or not) except pursuant to specific authorization of the director general for operations."

Arrangements have been made, it was announced, for the Defense Plant Corporation to pay for any of these planes purchased from present owners where the purchase is negotiated by the CAA for war training purposes.

Papuan Campaign Cited by MacArthur as Proof of Air Power's Role

Announcing the annihilation of 15,000 Japs in the Papuan victory, General Douglas MacArthur says "indissoluble union" of air and ground forces there points the way for a "broadened conception of warfare that will permit the application of offensive power in swift, massive strokes rather than the dilatory and costly island-to-island advance that some have assumed necessary in a theater where the enemy's far-flung strongholds are dispersed throughout a vast expanse of archipelagos."

"For months on end," he said, "air transport with fighter coverage moved complete infantry regiments and artillery battalions across mountains and jungles, transported field hospitals and other base installations to the front, supplied the troops and evacuated the casualties. For hundreds of miles bombers provided all-around reconnaissance, protected the coast from enemy naval units and blasted the way for the infantry's advance.

"A new form of campaign was tested which points the way to the ultimate defeat of the enemy in the Pacific," said MacArthur.

Enlist in your CIVIL AIR PATROL

Webb Shadle Named CAA General Counsel

Webb Shadle, World War flyer and formerly counsel to the director of finance for the state of California, has been appointed general counsel of the Civil Aeronautics Administration. In Washington he has been associated with the Petroleum Administrator for War in a legal capacity. Shadle succeeds Richard Elwell, who has been commissioned as a major in the Army Air Forces.

UPPER AIR SOUNDING in aeronautical meteorology won for F. W. Reichelderfer, left, U. S. Weather Bureau chief, the Robert M. Losey Award by the Institute of Aeronautical Sciences. The Institute presented to A. Lewis MacClain, right, the Octave Chanute Award for his development of an engine torque indicator and "outstanding work" in flight testing aircraft engines. MacClain is aircraft engine test pilot and engineer of the Pratt & Whitney Division of United Aircraft Corp.

FIRST LIEUT. CLARK GABLE is shown here in a moving turret atop a truck banging away at his target with a .50-cal. machine gun at the Flexible Gunnery School at Tyndall Field, Florida. The Air Forces recently graduated the actor from the course.

Alexandria, Louisiana

Breazeale Distributor for Piper and Lycoming

Wood Breazeale has bought out and will continue to serve the territory served by the late W. O. "Bob" Wight and by Mrs. W. O. Wight as distributor for Piper Aircraft Corporation and Lycoming and Continental engines and parts. The above transfer has the full sanction of the Piper Aircraft Corporation and the Lycoming and Continental Motors Corporation.

Mrs. W. O. Wight, for herself and in behalf of the late W. O. Wight, one of the South's leading light plane pioneers, hopes that all of their friends and customers will give to Wood Breazeale the same friendly co-operation that has been extended to them.

Wood Breazeale is not a stranger in aviation circles, and he has been associated with his brother, Raymond, for many years. Raymond is now with the Air Transport Command at Memphis, Tenn. Wood, who will carry on at the hangar at the municipal airport, Alexandria, holds these licenses: A & E, Commercial, Instructor, and Ground Instructor. He will have a complete stock of parts and an approved repair station, and he assures all airplane owners as well as CPT and CAP operators that they can call on him for dependable service. As soon as he is able to do so, he hopes to contact most operators personally and will offer services that are needed in today's stepped-up program.

Enlist CIVIL AIR PATROL *in your*

Dallas, Texas

Roving Reporter Takes to the Air

On tour with Tony and Vernon—Flying the course through the courtesy of Bob Millsap, of Hampton Airport, who provided the plane and pilot.

Hampton Airport—Taking off in our pretty Red Chief, from Hampton, Malcolm Vernon and Tony, of SOUTHERN FLIGHT, hit a wind which was smooth as a roller coaster, and just as determined to get some place as we were. (Different places, at that) . . . We headed for Waxahachie, arrived on course and slid in for a lulu of a landing . . . right on the taxi strip. We met N. A. Hill and Louis Suess who were working around the hangar like a pair of good Gremlins . . . Boyd Kennedy was down town getting ready to move to Gainesville where he is taking over a glider training deal . . . WTS note: The field will still operate, but the main business will be up yonder. N. A. Hill said to say "hello" to Jack Stewart . . . Hi, Jack!

Lou Foote's—Then we cleared for Lou Foote's busy airport, where there is a good place to get hot groceries at noon; don't try to beat the Marines or Navy boys to the booths . . . won't work. Ole Harvey Wiggins was running the PBX, while pretty Ivel Foote was checking the cash. We saw Nancy Penn, J. M. McLean, Mr. Stephens (who runs the ground school for Lou, teaching CX), and F. M. Engraum . . . J. W. Akin was talking to Vernon while J. C. Webb, Bandera, Texas, and McLean helped ole Tony with names . . . Everett DeGolyer has enlisted in the Air Corps, but is boxing the breeze out here 'til called . . . Eva James soloed from here.

White Rock—Off again, well fed, to White Rock, where all the bosses were enjoying the wind. "Mac" McWhirter, who likes the Esquire gals . . . who *doesn't*? . . . said to be sure and let him know about the Tax Bill which everybody here is getting "het up" about. Don't worry, we will. You should have seen the way I shot for a landing . . . dodo de luxe.

Hudson Airport—Did a little better at Hudson's . . . and tied the Red Baby down for our few minutes' visit . . . Jelly Cloud was in the new flight office holding the place down . . . its quite "fawncey" . . . Reported that "Mac" Davis from now on is to be known as an Instructor . . . new license . . . looked all over for Porter Holland . . . no could find . . . but saw tracks of R. P. Dabney and his brother, V. Dabney . . . who own a pair of Culvers . . . Jelly said: "W. A. Dorris is our new CAP squadron commander . . . and M. W. Gilliam is exec officer, G. W. Culler, personnel . . . R. N. Davis operations . . . Bornhard Dosterschill (honest, that's how he spelled it) is flight commander and C. E. Cloud is department staff officer" . . . they are going to town.

Mustang Airport—We beat the air over to Mustang, where Harry Sellers introduced us to the new Assistant Manager H. Y. Mays . . . we sat around and bulled about the Tax Bill . . . mentioned that Julian Freeman had been in town (he's the Shell Aviation man from Atlanta . . . flies the best-looking job), caught a weather report and skeedaddled for Hampton . . . was going to BLOW.

We had intended to stop at Victory and Schell to see what was cookin' but the wind whipped us . . . and, of course, we couldn't get permission to land at Love . . . so we just used some mental telepathy . . . Imagine ole Tom Collins in the first booth with a bottle of coke . . . Gene Royer on the other side . . . and Bill Koup asking them for listings on aircraft . . . Bill has opened new offices in the Administration Building and has a gillion airplanes on tap and parts you can't find any place . . . he'll have a lead on . . . he's a broker on used airplanes . . . Lockheed Flight Offices have moved . . . a very sad thing for one and all . . . think of the extra gas they'll hafta use to get a cup of tea or coffee if it can be found.

Well, we landed home at Hampton . . . went in and chatted with Ellen Brooks, a lovely miss with a P. T. and a yen for the Ferrying Command . . . Bob Millsap asked us how we

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liked the BLOW . . . was it a good trip and said we'd do it again sometime . . . we fretted about the Tax on Aircraft Bill, sent a wire to the Gov. . . . and scatted home to write this bit of Tour Talk . . . we report that "The wind doth blow, north of the Alamo" . . . But we're deep in the Heart of Big D . . . and thanks a million to Bob Millsap.

Bye now.

TONY HAGMANN

Enlist in your CIVIL AIR PATROL

Fort Worth, Texas

General Yount's Son Returns to West Point

Bob Singleton's eleven-plane "rode herd" of licensed pilots, fledglings and instructors was the largest cross-country flight of civilian hedge-hoppers on a hop to Gainesville and Denton. This group included: B. M. Roberts (about ready for flight tests in going after a commercial rating); A. O. Jones; Mrs. Verna Burns; Jack Maddox and student, David McMahon; C. O. Williams and student, Biford Sparkman; Gordon Wiley; Roy Ferrell and student, Ed Byers; Joe Pelich; Tom Purdue; Lester Moss and a fledgling going along incognito to keep peace in the family . . . Just to boost their cross-country time, Roberts hopped via Sherman, while Pelich headed for Mineral Wells . . . Tommie Marrs logged his longest cross-country dual, to Vernon.

Glenn Malmin, American Airlines radio operator, is missing from Meacham's runways due to being in New York for a few weeks in a specialist's school . . . Glenn was due to take his flight tests when the line spotted him for the special training.

Judson Cramer, Harry Davis, James Gammon, Erwin Malone and Edwin Van Orden, all of Fort Worth in the AAF reserve, are expecting their assignments to CAA secondary training schools. Reserves who finished their primary training at Midwest Field included Charles Devoe and Jack Reed Devoe.

Aviation Cadet Barton K. Yount, Jr., returned to West Point to complete his work and receive his second lieutenant's commission as a member of the military academy's first flying class. He hopes to visit his parents here before reporting to the Army Air Forces. It was a big moment at Columbus, (Miss.), Army Flying School when Maj. Gen. Barton K. Yount, commanding general of the nation's vast flying training program, pinned the silver wings he had won February 18, 1919, on his son.

W. H. Wiley, who marked up his solo some time ago at Midwest, acquired an Aeronca Chief from one of the town's fledglings, who bought the ship on the "Q. T." from the family. "B. R." (Before Rationing, remember?) . . . Fred Cox hopped his Taylorcraft to Kansas for a quick "look see" in a business deal.

Mrs. Verda Short is back, hopping the skyways at Midwest again after an absence of several weeks. She is going after a private license. Adding to the line is Gloria Harrison. Up for a forty-five-minute hop after a short absence was Mrs. Moralu Christian, who took the controls for the first time during the fall . . . Mrs. Dula Hardesty registered her initial solo in her Luscombe, and is making good time building hours for her private . . . Anita Jane Stewart has thirty hours in her log.

Harry T. Bibb, Jr., son of Mr. and Mrs. H. T. Bibb, of 1615 Blue Bonnet Drive, reports that he is winding up the cross-country training course at Wichita Falls, along with twenty-three other flyers who received their primary and secondary training here.

MARGARET EWING BOWMAN

Kansas City, Missouri

AAF Seeks Women Instructors

WNAA—With the first of the year, the Kansas City Unit of the Women's National Aeronautical Association fell in line with the other Units throughout the country in acting as recruiting agent for the Army Air Forces Technical Training Command in the third district, accepting applications of women to be trained as technical instructors in order to relieve men for combat duty. Women are sought for both junior and student instructors, with training to be given at any one of four schools of the Training Command: at Biloxi and Gulfport, Mississippi; at Wichita Falls and Amarillo, Texas. The training period is from sixteen days to two months, depending on the qualifications of the applicant. As this goes to press the National Officers advise the Kansas City Unit that the quota has temporarily been filled.

The Kansas City Unit's January dinner meeting was honored with the presence of the following National Officers, who had come to Kansas City for a National Board meeting: Mrs. Gordon Wright, president; Mrs. R. L. Hahn, secretary, and Mrs. John Cullens, editor of the national bulletin, AVIATRIX—all of Tulsa, Okahoma; Mrs. Rex Aber of Los Angeles, California; Miss Marion Newell, governor-at-large, and Mrs. Frederick G. Wirthman, WNAA Missouri governor, both of Kansas City. Guest speaker at the dinner was Miss Virginia Garst, twenty-three-year-old Kansas City ferry pilot, recently returned from England, where she had served with the Air Transport Auxiliary.

Women in Aviation—Faced with manpower shortage, the colleges are encouraging young women in aeronautical fields. With the beginning of the second semester at the University of Kansas, a special curriculum in aero-

nautical engineering, designed to train women for war production, has been inaugurated. Selected trainees will be employed by an aircraft manufacturer at the time of the enrollment in the course and will receive a compensation of $75 per month during the period of training. The subjects taught will include: stress analysis; weight control; production planning and control; drafting; production illustration; inspection and material control.

MARION MELCHER

Enlist in your CIVIL AIR PATROL

Las Vegas, Nevada

CAP Squadron Planned

Government authorization to operate Alamo Airport as a designated landing area was granted last month. Alamo Airport, located five miles south of Las Vegas on the L. A. Highway No. 91, is under the management of George Crockett, former salesman for the Stinson Aircraft Company. An adobe shop building, large enough to accommodate several planes is nearing completion. This building will temporarily house one of the few complete aircraft repair stations in this area and will be ready for use at an early date. Preliminary work has been started on the construction of a large adobe hangar with offices, class rooms and a large shop. This hangar will be a replica of the Alamo Mission and will be modern in every respect.

The entire airport will be on the "frontier" style with rail fences and the natural trees and plants of the locality and climate. A swimming pool with appropriate landscaping is planned and the entire project is being developed not only to provide a space for CPT operations to assist in winning the war, but also to have ready outstanding services and facilities for the post-war "flying tourist".

The initial meeting to organize a CAP Squadron in Las Vegas was held recently with Robert Cummings, actor and Squadron Commander of Hollywood, principal speaker.

Judging from the size of the group that attended this first meeting, there is a real interest in the CAP and a good, hard-working squadron is anticipated.

In addition to the regular organized CAP squadron there is to be a unit of experienced horsemen who will be drilled for emergency work in the mountains to operate in co-operation with the air branch.

GEORGE CROCKETT

Enlist in your CIVIL AIR PATROL

Shreveport, Louisiana

Badgett Graduates Honored

Muny Airport has now risen to the control tower class. Yes, the glass-enclosed traffic control tower built more than a year ago is now in operation, the eight operators maintaining a twenty-four-hour schedule. Traffic is terrific—due mainly to the increased wartime flight training by Badgett Flying School and daily use of the field by the Army as a transcontinental ferry stop. Everyone seems to be glad that this service has been installed and willing to co-operate to the fullest extent.

Badgett Flying School's CAA War Training graduates were honored at a special program in the Centenary gymnasium. Elementary "honorees" were John Phillip Bayer, New Orleans; Charles W. Birdsong, Shreveport;

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NEW CAA RULING

All classes of Mechanics, Ground Instructors and Parachute Riggers are required to make an activity report for the year of 1942. This report is due now and can be made at any CAA office.

The report will require a resume of the working year, the places where the Mechanic, Rigger or Ground Instructor has been employed and the duties performed. Forms are furnished by the CAA.

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Raymond L. Bond, Bossier City; Avon Chapman, Greenville; Devon Chapman, Greenville; Douglas Courtney, Shreveport; James Craft, Tylertown, Miss.; Murphy Crow, Marion; James Harold Davidson, Shreveport; Reeves Garmany, Logansport; Burton Hammons, Maydelle, Texas; William Higgenbotham, Shreveport; William Jennings, Greenwood; James Latimer, Ruston; Charles Lee, Shreveport; James Leverette, Shreveport; James McGonagill, Shreveport; Leroy Osteen Sledge, Shreveport; Roy Smith, Jr., Mansfield; John Stewart, Shreveport; Robert Thaxton, Floriene; Horace Watson, Homer; Wendell Wiggins, Shreveport; Buster Wilder, Bossier City; Herschel Woodyard, Jr., Shreveport.

Secondary "honorees" were Ralph Ashworth, Kilgore, Texas; Inmon Bledsoe, Vivian; Lawrence Campbell, Jr., New Orleans; Robert Canada, Port Arthur, Texas; Harold Cochran, Hollyridge; Ernest Copeland, Zwolle; John Cox, Welsh; Donald Dale, Palestine, Texas; Robert Dinning, Kilgore, Texas; Chalmers Duke, Jr., Carthage, Texas; Placide Dupree, New Orleans; Leonard Earley, Kilgore, Texas; Shelton Farrar, Shreveport; Albert Foster, New Orleans; Jimmie Gaunt, Longview, Texas; Billy Haney, El Dorado, Ark.; Tom Harding, Jr., Little Rock, Ark.; James McConathy, Jr., Shreveport, Langtry McDonald, Shreveport; John Morris, Jr., Mineola, Ark.; Lonnie Pace, West Monroe; Lincoln Pope, El Dorado, Ark.; Rudolph Rice, Henderson, Texas; Thomas Robbins, Norphlet, Ark.; Lynn Roeder, Kilgore, Texas; George Sharman, Shreveport; and Robert Southwell, Kilgore, Texas.

MARJORIE HARDMAN

Enlist in your CIVIL AIR PATROL

Tulsa, Oklahoma

CAP Holds Top Interest

Civil Air Patrol is still number one with all private pilots around here, and why not? . . . . we have the finest in Oklahoma and probably the finest in the Southwest (quoted by Major Moss Patterson, our State Wing Commander from Oklahoma City) no foolin' . . . and most of the credit goes to Captain Gerald H. Westby. He sure gets the job done.

Tulsa's Number One Squadron is still meeting one night a week, although all of 'em have graduated . . . and Number Two meets twice a week. On Sundays, both squadrons meet at Commercial Airport for drill, flight problems and to build up flying time.

About the nicest thing—CAP now owns an airplane (Stinson), and thanks to oh, so many people! . . . especially Gerry Westby. A lot of members are taking time in it. Just ask Lieut. Clark Millison; he keeps the little black book for it and says it is dated up for days ahead. We also have Harry Fitzgerald to thank; he is giving flying instructions and isn't charging a penny for his time. Gertrude Guinn, Katy Patton and Mildred McCelland, and a lot of the boys, already have soloed it.

We sure miss Capt. W. G. (Bill) Green, who is on coastal patrol duty. I hear he is in town for a few days, but haven't seen him as yet . . . something to look forward to.

Remember Betty Whitlow and Margaret Ann Hamilton—you'll find them in Houston, training under the direction of Jacqueline Cockran, for the Women's Auxiliary Ferrying Squadron.

More girls who have the WAF's as their goal are: Maxine Stewart (she passed her written the other day), Janet Ward, Ellen Endacott, and Hulda Miller . . . and, of course, myself. You bet!

Quite a few changes have taken place at the Commercial Airport. John Armstrong, one of Tulsa's best-known pilots, and manager of the Commercial for the past ten years, is resigning. Friends credit Johnny with encouraging private flying in Tulsa perhaps as much as any other man in the past ten years. What is he going to do? He said he was going to take a rest . . . who's kidding who? Any way, we will certainly miss him, and also his wife, Corrine, who has been working in the office, and adds a lot of fun to the place.

Some of the boys got together and organized a corporation, so they could keep the port going. Marvin Sullinger will be manager; L. L. Dresser is president; Clark Millison, vice president; and Sherwood Morgan, secretary and treasurer. On the board of directors, we have John Esau, Fred Cooper, Dresser, Millison and Morgan.

Out Harvey Young way—his airport is busier than ever, there just aren't enough planes for the boys. They have started night classes, to be held in town, three nights a week. Keith Clevenger, Dot Lemons, Jack McElroy and Vern Bishop will do the instructing.

JONNIE LAIRMORE

Enlist in your CIVIL AIR PATROL

Fifth Ferrying Command WAFS Come to Love Field

Suppose your boss said: "Write a story on the girl pilots now stationed at Love Field" . . . what would you do? Well, so did this reporter. And what happened? It was like this: We went out to Love Field, asked for the Public Relations office, and explained our mission gleefully. But, no dice. The young ladies have come to fly and not to be interviewed by any roving reporters. We could have all the pictures they had, all the dope they thought we needed, and could "blind fly" the rest of the story.

So after snooping around we can report that the girls are making good. We didn't meet any of them, but saw Miss Florence Miller, of Odessa, Texas, when she was walking into the control office. That's as close as we came.

When we received news that the headquarters were being moved and Mrs. Nancy Love would be stationed in Dallas, with her WAFS, we wondered what the changes in the Fifth Group would be. Let us state here: there were none. The girls have been absorbed into the Post life, fly their trips just like any other pilots, and are doing a very smooth job of handling the craft assigned to them.

So far, they are flying the trainers—BT-15's and Stearmans. It was told to us that they received a tough check ride and not only came out with flying colors, but with the sincerest admiration of their check pilots for their ability. They may be flying the A-11's before long.

We took a look at the files and found that the four WAFS who are here at present are: Opal Ferguson, Dorothy Scott, Helen Richards, Florence Miller, and Mrs. Nancy Love.

Opal Ferguson, who received her instruction at the Rawden Flying School, Wichita, Kansas, is from Coffeyville, Kansas. She learned to fly on her own dough earned as a stenographer. After receiving her instructor's license, she made up time by teaching a CPT. She was one of the first to join up for the WAFS.

Dorothy Scott is from Oroville, Washington. Dorothy attended the U. of W. and learned to fly in 1941. She went through the CPT Primary and wound up an instructor. She also made one forced landing from the back of a Dallas horse and cracked her collar bone . . . so at this writing she is not flying.

Helen Richards is from out Pasadena, California, way. She has a full 1,000 hours which she acquired since her first solo in 1930. Miss Helen attended Pasadena Junior College and was very active in the women's division of the Athletic Association.

Florence Miller is the only Texas miss. She hails from out in West Texas . . . Odessa's the town. Florence went to Sul Ross State Teachers and Baylor College . . . and she began to fly in 1940. From June till now she has better than 1,000 hours, and it's not all "airport time". If she flies like she looks—and we hear she does—she's a dillie of a pilot.

Mrs. Nancy Love, who heads up the gal pilots, is a right pretty gal herself. She began to box the breeze around in 1930, and by 1933 she had a commercial ticket which she began to use with a purpose. She has flown aircraft to the Canadian border to be towed across . . . 'member that deal? . . . has delivered planes all over the east to people who bought said aircraft and wanted delivery, and has demonstrated safety planes. At the last count she has better than 1,200 hours.

We went over and asked the hangar pilots at the airport what their opinion was of the gals, and received favorable comment, such as: "Well, I saw one of them take off and I wouldn't have known it was a gal if I hadn't heard her talk to the tower." . . . "Just as good as the men" . . . "Better than some of our pilots who've been taking off here for months, the way I see it." And when the hangar flyers have given you a check ride (from the bench) and you're okayed by them, you're in. So it looks like the girls are "In".

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Civil Air Patrol

Military Missions for CAP Steadily Mounting; Helpful Tips Listed

Reporting an ever-increasing number of assignments of CAP personnel for active military missions, Civil Air Patrol National Headquarters has reminded hopefuls that those assigned are under the direct jurisdiction of the Army and therefore must conduct themselves in keeping with strict military regulations.

Courier service, tracking flights for practice in sighting anti-aircraft guns, tests of the aircraft warning system and similar missions are in progress on a widening scale.

Usual requirements are 150 hours flying time including at least fifty cross-country. On courier service, assignments are from two weeks to a month, Longer assignments are required of some of the other missions. But the general idea is to limit the tour so as to spread the work throughout the CAP membership. *(Continued on page 62)*

MESSAGE PICKUP, part of CAP training, is graphically illustrated by Charley Hubbel in the Group 514 "News" published in Cleveland, Ohio. The ship is Chuck Roberts' Aeronca Scout, in which Artist Hubbell is observer.

Time Magazine Echoes Seamen's Admiration as Air Force Reveals CAP Carrying Bombs

Those who had known all along, but who kept the secret because of strict censorship, got a kick out of the January issue of AIR FORCE, official publication of the Army Air Forces. It carried a little item, far back in the book behind such small-lettered articles as "Watchmasters Keep Air Forces on Time," describing how an AAF officer had devised "inexpensive but effective" bomb racks and bomb sights for the Civil Air Patrol. AIR FORCE editors, apparently unaware that a story announcing the CAP carries bombs is big news, put a mild little head on the item, reading "Inexpensive Bombing for Civil Air Patrol."

But TIME magazine's editors, fully cognizant of the tremendous newsworthiness of the CAP, jumped on the insignificant little item and played it, in their January 25 issue, for what it was worth, declaring AIR FORCE had "debagged a cat" which the close-mouthed CAP had kept securely tied. TIME used this significant tribute: "Men in ships (merchant seamen), hardened by endless repetition to the inherent hazards of their own calling, still gape with honest admiration when they hear the sewing-machine hum of a low-powered CAP engine far from land and see a tiny landplane soaring overhead, patiently on the watch for the feather of a U boat periscope." To seamen, says TIME, two organizations stand "head and shoulders above all others." One is the U. S. Navy. The other is the "unpaid, volunteer Civil Air Patrol."

Herewith is a reproduction of the historical AIR FORCE revelation that the CAP is carrying bombs in its campaign against Axis submarines.

Inexpensive Bombing For Civil Air Patrol

—From AIR FORCE, Jan., 1943.

MANY small Civil Air Patrol planes covering long reaches of the American coastline are equipped with inexpensive but effective bomb racks and bombsights invented by Major Lester G. Orcutt while he was stationed at Morrison Field, Florida.

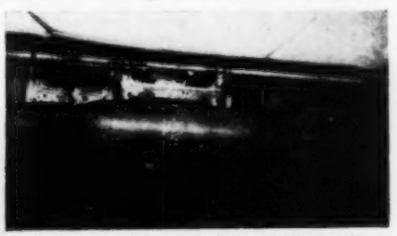
The bomb rack was designed, built and installed on a Stinson 105 in 48 hours, at the request of Army Air Force Headquarters. It was built to carry 100-pound demolition bombs so CAP planes could blast subs they spotted on their daily patrols.

Pilots who flew the planes soon wanted a bombsight so they could aim their bombs. Two days later Major Orcutt had turned one out. The materials only cost 20 cents, but it was effective up to 3,000 feet. So successful was the bombsight and racks that they have since been produced en masse for light patrol planes in all parts of the country. For certain special purposes it has even been used on occasion in regular military planes.

Major Orcutt's bomb rack is a metal frame attached to the right lower longeron. The release lever is placed on the floor of the cockpit right in front of the co-pilot's seat. Since the first design, the rack has been improved so that it can carry two demolition and two smoke bombs.

The bombsight is made of metal and consists chiefly of two adjustable sight rings. It is attached on the outside of the cockpit door of the small planes for which it was designed. The positions of both the sight and the racks are shown in the accompanying photographs.

Major Orcutt's bombsight, in position.



The bomb rack in use, holding 100-lb. bombs.

Gale and Half-Mile Visibility Bested by CAP Rescue Plane

Clara E. Livingston, attached to the Jamestown, Pennsylvania, squadron, recently located a drifting barge off Cleveland harbor but couldn't identify it.

Despite gale-like winds and half-mile visibility, she returned to the airport and flew as observer in a plane piloted by Capt. Dwight P. Joyce, commander officer of Group 514 of Ohio. They located and identified the barge as the Cleveco, adrift after its tug had foundered with a loss of fourteen lives.

Six-State Courier Network Is Possible

With the Illinois Wing's activation of courier service in the Chicago sector and its contemplated extension to downstate areas, it soon may be possible to link courier facilities in Louisiana, Texas, Arkansas, Kansas, Illinois and Missouri. The Missouri and Kansas Wings plan service for the aviation industry in that area, and the Arkansas Wing has been anxious for an interstate network since early last year.

—Tulsa Tribune (left) and John Esau (right) Photos.

OKLAHOMA CAP UNITS have been active recently. At left above is the staff of the Northeastern Oklahoma Group with Lt. James L. Gartner, deputy operations officer (left, seated) and Capt. Gerald H. Westby, Group Commander, planning a scrap hunt from the air. Standing, left to right, are Lieutenants Roger V. Devlin, intelligence; John Esau, public relations; James P. Walker, communications; Don M. Mattocks, supply; George Giltinan, Squadron I commander; W. H. Van Horn, transportation, and Arthur H. Montgomery, adjutant. In the photo at right above are Mayor Veale of Tulsa, Capt. Gerald Westby and Wing Commander Major Moss Patterson photographed during recent CAP graduation ceremonies.

Howard Hughes' Firm Advertises CAP Emblem

JOE WHEELER

The flying triangle of the Civil Air Patrol, featuring the likeness of Commander Joe Wheeler of Squadron 814-4, has appeared on natural color covers of both Oil & Gas Journal and The Oil Weekly, thanks to advertiser Howard Hughes.

Wheeler, granted instructor's rating in December, is chief of the CAP squadron based at Houston's Skyport. He was selected as representative of the CAP for the "Worth Knowing . . . Worth Showing" series sponsored by Hughes Tool Company.

New Wings for CAP, Active-Duty Emblems Can Be Obtained

For officers only, a new winged device is now available to wear on the garrison cap with visor used by the Civil Air Patrol. Enlisted personnel wear the disc emblem.

Also available are active-duty emblems designed for Coastal Patrol, Flight Surgeons on Coastal Patrol, active Courier Service, Liaison Patrol and Forest Patrol. They are in the form of a black satin square with various designs in gold-colored thread, and are to be worn, with service stripes, on the left sleeve.

MILITARY MISSIONS

(Continued from page 61)

Those hopeful of being called should heed the following words-to-the-wise as issued from National Headquarters:

When a CAP pilot reports to an Army base for duty, he is under the direct jurisdiction of the Army Commanding Officer who will give him orders and may relieve him from duty. The pilot is subject to discipline under the Articles of War. He may exercise discretion only in cancelling flights which in his judgment are unsafe because of weather or condition of the plane.

Pilots go on duty with the CAP officer grades which they hold or, if not already officers, are appointed temporarily by the Wing Commanders as 2nd Lieutenants.

Thus the first essential is for each pilot to behave as an officer. Read the manual on *military courtesy and discipline* from cover to cover. Check out on it with your unit Training Officer. Learn to stand at attention, walk, and salute like a soldier. Be sure your uniform is clean and in good press; that your insignia, buttons, and buckles are all shining; and that everything about your uniform, including the placement of insignia, is correct in every detail. Your appearance and the impression you make will have much to do with the success of the whole operation.

Remember that each Army post has its own rules and customs. Inquire about them; learn them; observe them. Talk little and listen a lot. Keep your plane well out of the way of heavier ships and their prop streams. Don't ask for help on anything you can do yourself.

CAP pilots on assignment have been observing these rules. In consequence, we hear reports that they have been welcomed into officers' clubs and given friendly assistance. Their services are increasingly in demand at posts where CAP has demonstrated what it can do. You can help keep it that way.

Many other points are covered in detailed directives issued and in preparation. Study them carefully. The mission often depends upon the *immediate* availability of personnel and equipment. BE READY!

NEW REFERENCE BOOKS

Dictionary of World Literature Criticism—Forms—Technique
$7.50 edited by J. T. Shipley with Henry S. Canby, Andre Maurois, Lewis Mumford, Allen Tate, G. A. Borgese a.o.

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$6.00 edited by Dagobert D. Runes with the collaboration of numerous scholars.

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From Copernicus to Einstein
$2.00 by Hans Reichenbach. Scientific history of the ideas and discoveries that have led to the formulation of the theory of relativity.

Who's Who in Philosophy
$4.50 edited by Dagobert D. Runes. The first complete biographical and bibliographical directory of all living Anglo-American philosophers.

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